PROPERTY OF
E. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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PRODUCTION CHANGES
BULLETIN 148

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 278	
	Motorola models Y21C3, B, Y21K21, B, Y21K22, Y21K23, B, Y21K24, Y21T19, B, Y24K4, B, Y24K5, B, 21C3, B, 21K21, B, 21K22, 21K23, B, 21K24, 21T19, B, 24K4, B and 24K5, B (Ch. TS-528, Y and TS-603, Y) were covered in Photofact Folder 7 – Set 278. Models Y24K7, B and 24K7, B (Ch. TS-603, Y) are added along with late production changes, in the publication of this bulletin.
Ch. TS-528A-01, TS-603A-01	TO ELIMINATE EXCESSIVE IGNITION NOISE PICK-UP R17 is decreased from 330KΩ to 10KΩ. R19 is decreased from 330KΩ to 220KΩ. TO IMPROVE SYNC STABILITY C73 is omitted. L27 is replaced by a 1.2KΩ resistor. R44 is disconnected from ground and connected to the junction of C44 and R32. R32 is decreased from 33KΩ to 22KΩ. The B+ lead feeding the screen of the 3rd. video IF (pin 6 of V5) is removed. A 1KΩ resistor is added from pin 6 of V5 to the junction of C72 and R39. A 22MMF capacitor is added from the junction of the 1KΩ resistor and R39 to ground. A coil and a 22MMF capacitor (connected in series) are connected from pin 6 of V5 to ground. R39 is decreased from 10KΩ to 5.6KΩ. R38 is decreased from 22KΩ to 10KΩ. A 3.3KΩ resistor is added between the junction of R38 and R39 and the junction of R37 and L33. R88 is omitted.
Ch. TS-528A-02 TS-603A-02	TO PREVENT LOSS OF SOUND AND PICTURE AT LOW CONTRAST LEVEL R42 is decreased from 1Meg to 680KΩ. TO IMPROVE BRIGHTNESS R38 is increased from 10KΩ to 12KΩ.
Ch. TS-528A-03 TS-603A-03	TO ALLOW V3 AND V4 TO WORK INDEPENDENTLY R31 is increased from 3KΩ to 6.8KΩ. A 6.8KΩ resistor is added from pin 6 of V3 to the 245V line. TO IMPROVE SOUND TO NOISE RATIO ON LOW CHANNELS L4 is changed to part #24K735125. C7 is increased from 22MMF to 47MMF. Tuner coding changes to part #TT-70B.

MOTOROLA MODELS Y21C3, B, Y21K21, B, Y21K22, Y21K23, B, Y21K24, Y21T19, B, Y24K4, B, Y24K5, B, Y24K7, B, 21C3, B, 21K21, B, 21K22, 21K23, B, 21K24, 21T19, B, 24K4, B, 24K5, B, 24K7, B (Ch. TS-528, Y, TS-603, Y)

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Ch. TS-528A-04 TS-603A-04	TO ELIMINATE DOUBLE TUNING ON CHANNEL 2 L5 is changed to part #24A735121. L6 is omitted. L10 is replaced by three separate coils. Tuner coding changes to part #TT-70C or TT-70CY. R93 is omitted. R92 is connected to pin 5 on the yoke plug.
Ch. TS-528A-05 TS-603A-05	TO ELIMINATE VIDEO IF BLOCKING C60 and R53 are omitted. R54 is increased from 2.2KΩ to 10KΩ. R34 is increased from 1KΩ to 8.2KΩ. R39 which was decreased from 10KΩ to 5.6KΩ. in change "01" is increased to 10KΩ. The 1KΩ resistor added in change "01" is removed from the junction of C72 and R39 and connected in series with a 39KΩ resistor to the 245V line. A .1MFD capacitor is connected from the junction of C72 and R39 to the junction of the 1KΩ resistor and the 39KΩ resistor.
Ch.TS-528A-06 TS-603A-06	TO INCREASE HORIZONTAL STABILITY An 82KΩ resistor is added in series with the horizontal hold control (R4). The horizontal hold control (R4) is decreased from 250KΩ to 100KΩ. The new control part number becomes #18K734145.
Ch.TS-603A-07 TS-603B-02	TO ELIMINATE RINGING T5, deflection yoke changed to part #24K734873. With this new deflection yoke several new components are added. A partial schematic is given in Fig. 1 showing the new arrangement.
Ch.TS-528B-00 TS-603B-00	NEW VHF TUNER A new VHF tuner is incorporated. A schematic (Fig. 2) and alignment procedure are given in this bulletin.

RF AND MIXER ALIGNMENT

Remove battery used in IF alignment and ground AGC circuit by placing a jumper between AGC lug on tuner and chassis.
Adjustments A5, A6, A7 and A9 thru A20 are adjusted by compressing or expanding coil turns.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A1, A2	Preset adjustments A3 and A4 at mid-capacity. Preset A28 for maximum inductance (core fully clockwise). Preset A8 for MINIMUM inductance (core fully counter clockwise). Adjust A1 and A2 for maximum amplitude and response similar to Fig. 1.
2.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A3, A4	Adjust for maximum amplitude, proper tilt and correct marker positions as in Fig. 2.
3.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check for proper response curve on each channel. If response is not within limits on each channel, repeat steps 1 and 2. If necessary, make compromise adjustments of A1 thru A4.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
4.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A5, A6, A7	Adjust A5, A6 and A7 in this order for response curve similar to Fig. 2. Adjust A5 and A6 for correct marker positions. Adjust A7 for maximum gain and MINIMUM tilt.
5.	"	"	"	87.75MC	"	"	A8	Adjust A8 until response curve is just affected at sound marker point.
6.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A9, A10, A11	Adjust for response curve similar to Fig. 2. Adjust A9 and A10 for correct marker position and A11 for maximum gain and MINIMUM tilt.
7.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A12, A13, A14	Adjust for response curve similar to Fig. 2. Adjust A12 and A13 for correct marker positions and A14 for maximum gain and MINIMUM tilt.
8.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A15, A16, A17	Adjust for response curve similar to Fig. 2. Adjust A15 and A16 for correct marker positions and A17 for maximum gain and MINIMUM tilt.
9.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A18, A19, A20	Adjust for response curve similar to Fig. 2. Adjust A18 and A19 for correct marker positions and A20 for maximum gain and MINIMUM tilt.

OSCILLATOR ALIGNMENT

Use only enough sweep generator output to produce usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	209.75MC	12	Vert. Amp. thru 47KΩ to 2nd. detector output (pin 3 of test socket). Low side to chassis.	A21	Preset A22 at mid-capacity. Adjust A21 to place marker in sound trap notch as in Fig. 3.
11.	"	"	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp)	215.75MC 209.75MC 203.75MC 197.75MC 191.75MC 185.75MC 179.75MC	13 12 11 10 9 8 7	"	A22	Check channels 7 thru 13 noting if sound marker for each channel falls just above the trap notch. If more than a 30 degree rotation of the fine tuning is required to place the marker in proper location on any high band channel, set sweep generator and marker generator for channel 7 frequencies and adjust A22 to place sound marker in trap notch as in Fig. 3.
12.	"	"	213MC (10MC Swp)	215.75MC	13	"	A21	Check for correct sound marker position as in Fig. 3. If necessary readjust A21 to place sound marker in trap notch.
13.	"	"	85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	87.75MC 81.75MC 71.75MC 65.75MC 59.75MC	6 5 4 3 2	"	A23 A24 A25 A26 A27	Adjust to place sound marker in sound trap notch as in Fig. 3. A23 thru A27 are adjusted by compressing or expanding coil turns.

45.0MC TRAP

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	45.0MC (10MC Swp)	45.0MC	2	Vert. Amp. to pin 3 of test receptacle. Low side to chassis.	A28	Increase sweep generator output to produce visible marker on scope. Adjust A28 for MINIMUM response at 45.0MC.

UHF IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Direct	High side to point (B). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	UHF	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A29, A30, A31	Adjust A29, A30 and A31 for response similar to Fig. 4. Adjust A29 and A30 for correct marker positions and A31 for maximum gain and MINIMUM tilt. A29 and A30 are adjusted by compressing and expanding coil turns.

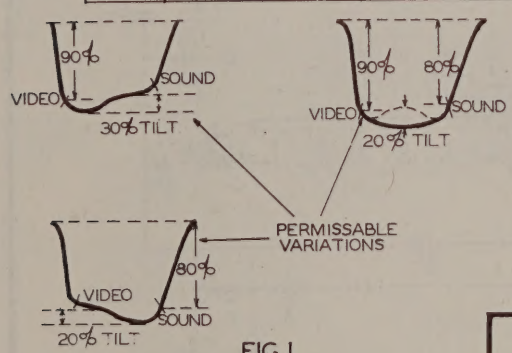

FIG. 1

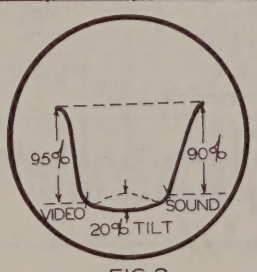

FIG. 2

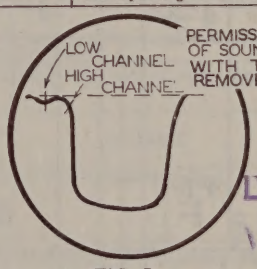

FIG. 3

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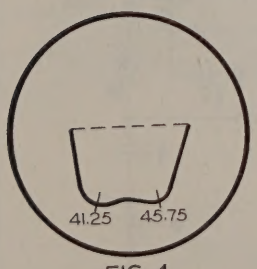


FIG. 4

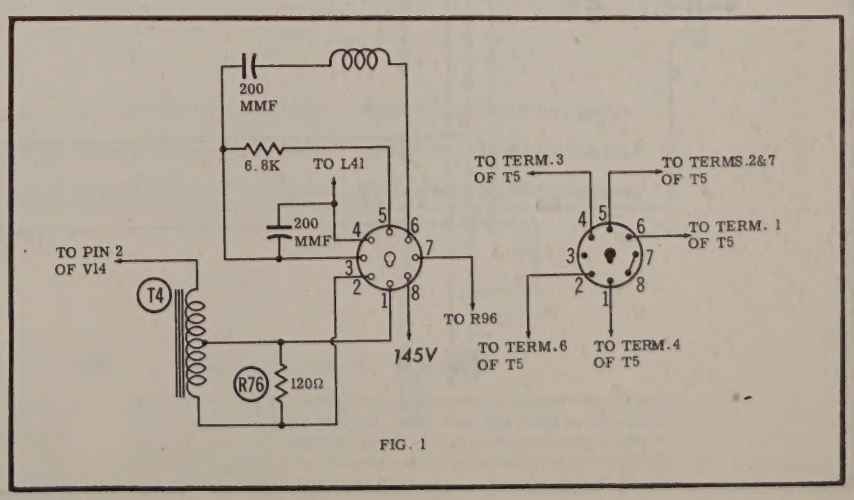


FIG. 1

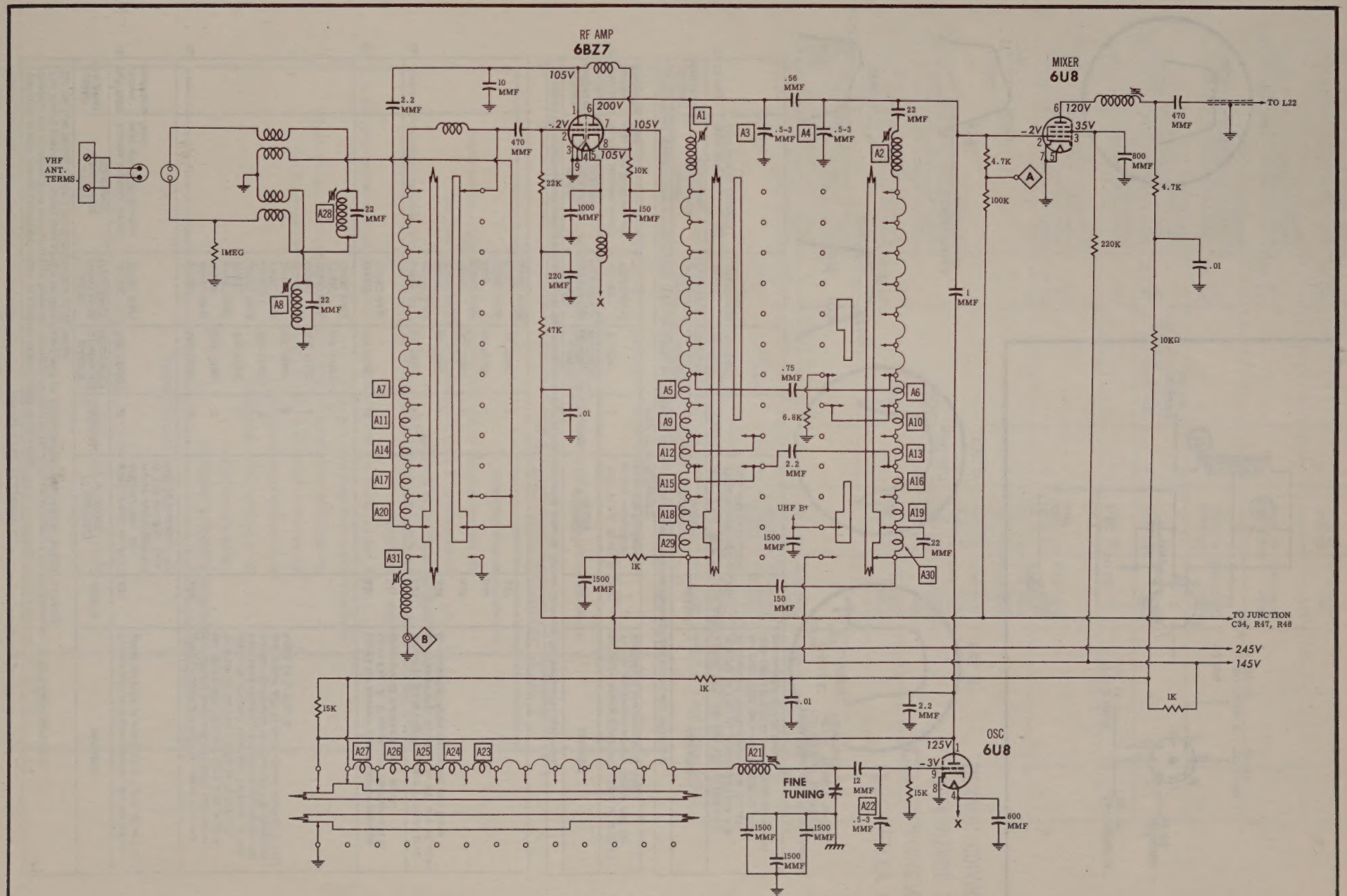
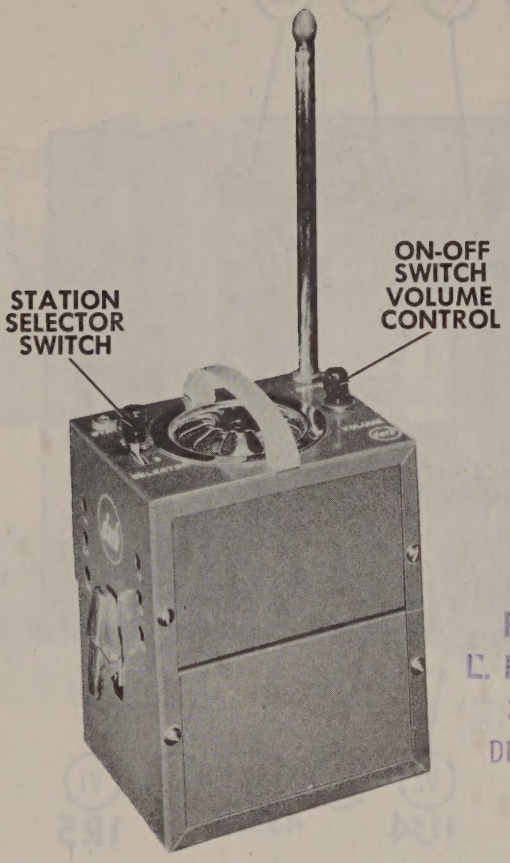

RF AMP
6BZ7
MIXER
6U8
OSC
6U8
VHF ANT. TERMS
1MEG
A28
A8
22 MMF
10 MMF
2.2 MMF
470 MMF
105V
200V
-.2V
22K
10K
150 MMF
1000 MMF
220 MMF
47K
.01
A7
A11
A14
A17
A20
A31
B
A1
A2
A3
A4
.5-3 MMF
.56 MMF
22 MMF
.75 MMF
6.8K
2.2 MMF
UHF B+
1500 MMF
1K
150 MMF
A5
A6
A9
A10
A12
A13
A15
A16
A18
A19
A29
A30
1 MMF
120V
35V
4.7K
100K
A
800 MMF
220K
10KΩ
TO L22
TO JUNCTION C34, R47, R48
245V
145V
15K
A27
A26
A25
A24
A23
A21
125V
-3V
FINE TUNING
12 MMF
A22
X

FIG. 2

DARB
MODEL "Holiday"



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DARB
MODEL "Holiday"

TRADE NAME	Darb Model "Holiday"
MANUFACTURER	S. C. Ryan Co., 1316 Yale Place, Minneapolis 3, Minn.
TYPE SET	Battery Operated AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 67.5 Volts "B" Supply RATING 250MA @ 1.5 Volts DC & 9MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	550KC-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~ Mod.)		Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output.
2.	10MMF	High side to antenna terminal. Low side to chassis.	550KC		"	A5, A6	Screw trimmers completely in and adjust A5, A6 for maximum output.

TUNING ADJUSTMENT

Note-Tune all stations with antenna fully extended.
Selector Switch in Position #1
Select station between 550KC and 1350KC, adjust B1 until desired station is heard, Adjust B2 for maximum volume.
Selector Switch in Position #2
Select station between 600KC and 1600KC, adjust B3 until desired station is heard. Adjust B4 for maximum volume.
Selector Switch in Position #3
Select station between 1100KC and 1650KC, adjust B5 until desired station is heard. Adjust B6 for maximum volume.

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PARTS LIST AND DESCRIPTIONS

DARB
Model "Holiday"

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		DARB PART No.	STANDARD REPLACEMENT	
V1	Converter	1R5	1R5	
V2	IF Amp.	1U4	1U4	
V3	Det. -AVC-AF Amp.	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DARB PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	8	150	CS-2256-1			TC41	TD-8-150	FM-1508	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DARB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	10000		CS-2258-4	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C3	50		CS-2258-5	BPD-00005	DD-500	GO34	831-500	UC-545	5GA-Q5	
C4	100		CS-2258-3	BPD-0001	DD-101	GO42	801-101	UC-531	5GA-T1	
C5	2000		CS-2258-2	BPD-002	DD-202	KO72	801-002	DC-522	5HK-D2	
C6	100		CS-2258-3	BPD-0001	DD-101	GO42	801-101	UC-531	5HK-T1	
C7	5000		CS-2258-1	BPD-005	DD-502	KO80	811-005	DC-525	5HK-D5	
C8	5000		CS-2258-1	BPD-005	DD-502	KO80	811-005	DC-525	5HK-D5	
C9	2000		CS-2258-2	BPD-002	DD-202	KO72	801-002	DC-522	5HK-D2	
C10	10000		CS-2258-4	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DARB PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	BS2243	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.

RESISTORS

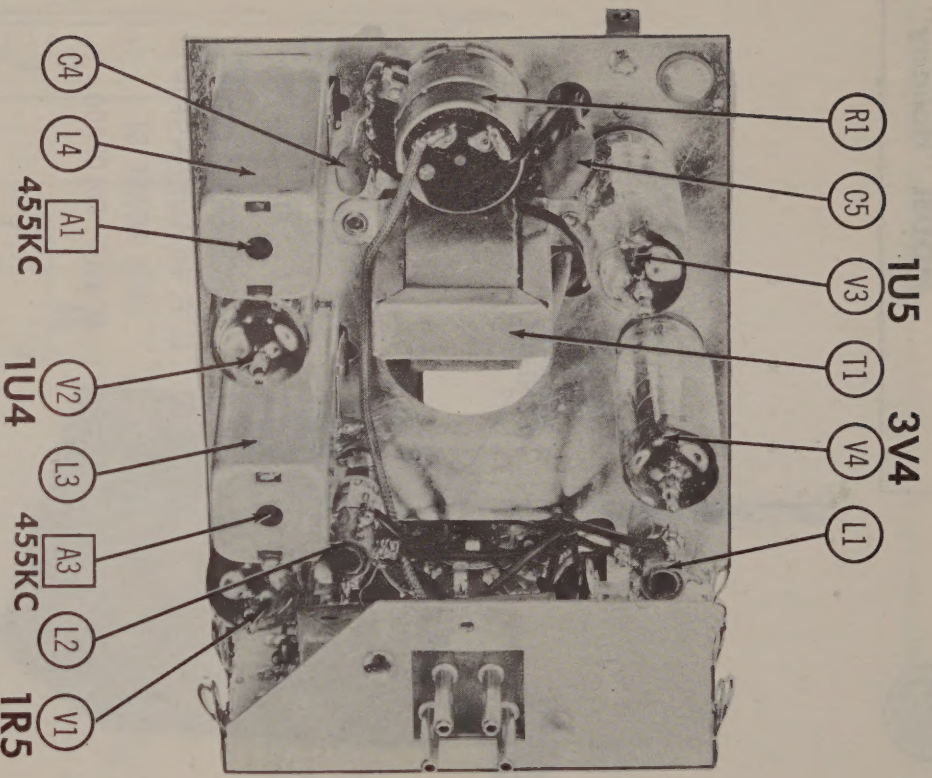
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DARB PART No.	IRC PART No.	
R2	4.7Meg	½	CS2263-5	BTS-4.7Meg	
R3	100KΩ	½	CS2263-2	BTS-100K	
R4	10Meg	½	CS2263-1	BTS-10Meg	
R5	4.7Meg	½	CS2263-5	BTS-4.7Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DARB PART No.	IRC PART No.	
R6	1Meg	½	CS2263-6	BTS-1Meg	
R7	2.2Meg	½	CS2263-4	BTS-2.2Meg	
R8	470Ω	½	CS2263-3	BTS-470	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DARB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9KΩ	3.2Ω	BS2246		A-2927		24S49	S-11Z	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	DARB PART No.	QUAM PART No.	RCA TYPE No.	
SP1	3½"	PM	3.2Ω	BS-2247			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	DARB PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	50Ω	9Ω	BS2248	14-1071	BC-386	70-A	
L2	Osc. Coil	1.8Ω	5.8Ω	BS2249	14-1074	BC-387	70-Osc.	
L3	Input IF	27Ω	27Ω	BS2244	16-6758	BC-352	12-C1	
L4	Output IF	27Ω	27Ω	BS2246	16-6758	BC-353	12-C2	

BATTERIES

ITEM No.	VOLTAGE	DARB PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V "A"		950			2R			Connect 2 in parallel
M2	67.5V "B"			467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	DARB PART No.	NOTES
M3	Switch		Station Selector (2 Pole-3 Position Rotary, Wafer Type)
B1	Trimmer Cap.	BS2282	Osc. (9-180MMF) Station 1
B3	Trimmer Cap.	BS2282	Osc. (9-180MMF) Station 2
B5	Trimmer Cap.	BS2282	Osc. (9-180MMF) Station 3
B2	Trimmer Cap.	BS2284	Ant. (50-380MMF) Station 1
B4	Trimmer Cap.	BS2283	Ant. (25-280MMF) Station 2
B6	Trimmer Cap.	BS2283	Ant. (25-280MMF) Station 3

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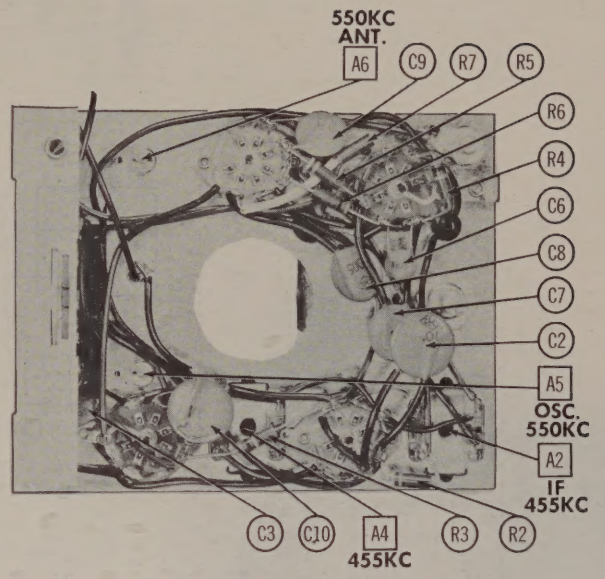
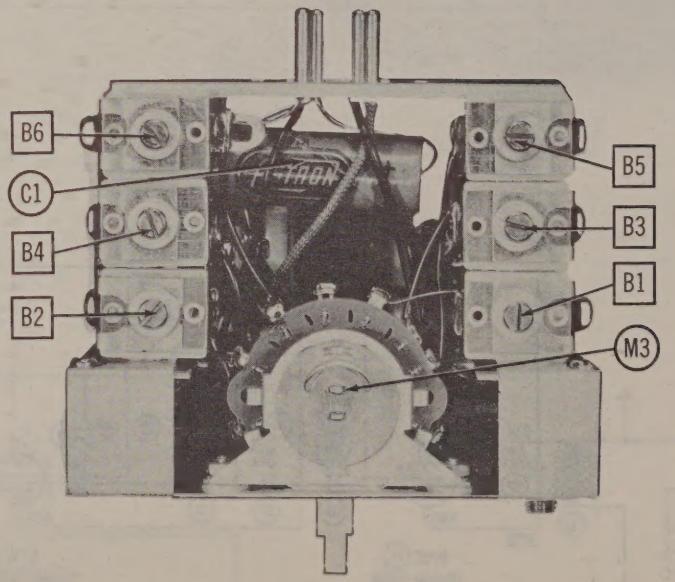
CHASSIS—BOTTOM VIEW

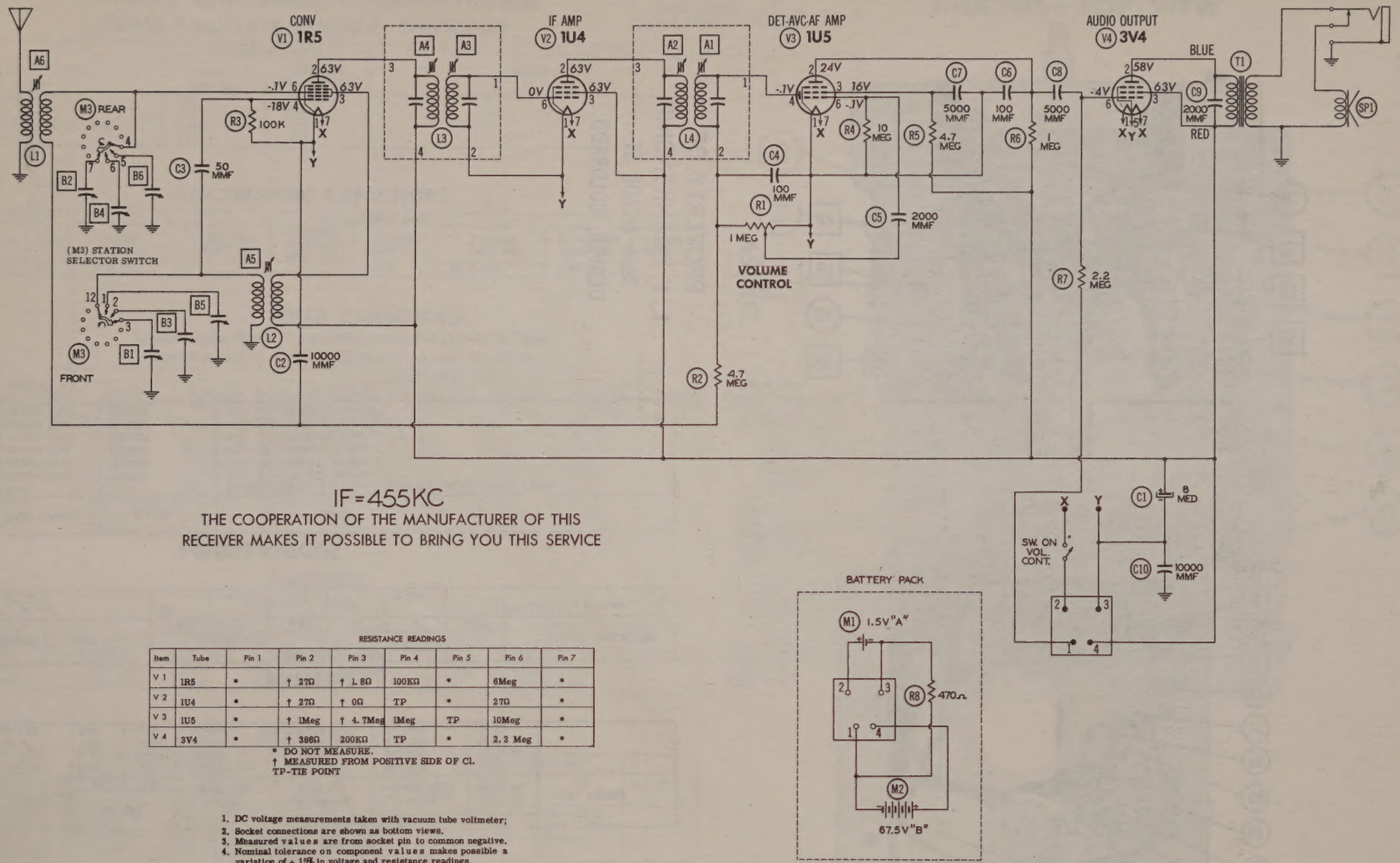




CHASSIS - SIDE VIEW

DARB
Model "Holiday"

DARB
Model "Holiday"



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	† 27Ω	† L 8Ω	100KΩ	*	6Meg	*
V 2	1U4	*	† 27Ω	† 0Ω	TP	*	27Ω	*
V 3	1U5	*	† 1Meg	† 4.7Meg	1Meg	TP	10Meg	*
V 4	3V4	*	† 386Ω	200KΩ	TP	*	2.2 Meg	*

* DO NOT MEASURE.
† MEASURED FROM POSITIVE SIDE OF C1.
TP-TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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EMERSON MODEL
834-B (Ch. 120270-B)

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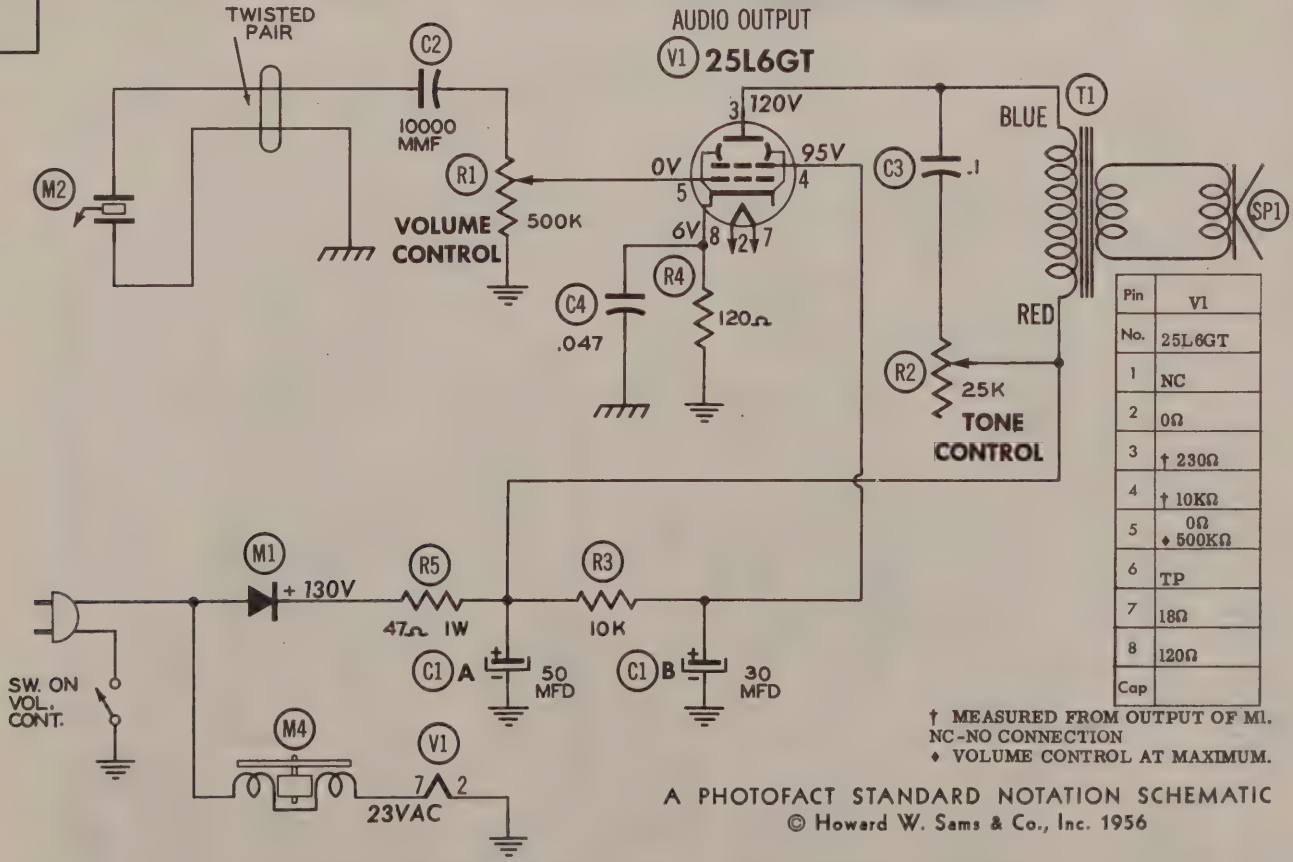
DENVER, COLORADO

TRADE NAME	Emerson Model 834-B (Ch. 120270-B)
MANUFACTURER	Emerson Radio & Phonograph Corp., 14th & Coles Sts., Jersey City 2, N.J.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Manual Record Player
TUBES (One)	Type 25L6GT Output
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.33 Amp. @ 117 Volts AC



Pin No.	V1 25L6GT
1	NC
2	0Ω
3	† 230Ω
4	† 10KΩ
5	0Ω ♦ 500KΩ
6	TP
7	18Ω
8	120Ω
Cap	

† MEASURED FROM OUTPUT OF M1.
NC-NO CONNECTION
♦ VOLUME CONTROL AT MAXIMUM.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	Audio Output	25L6GT	25L6GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	925312	PRS150V3050	BBRD5315	TCD497	TDL-5030-150	MTD-301	TVA-2450
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000		928027	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C3	.1	400	923515	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C4	.047	400	923554	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	390357	AB-616	A47-500K-S	Q11-133	U-50	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2A	25KΩ	½	390358	AB-29	A47-25K-W		U-28A	Tone
B	Shaft		Not Req.	AK-4	KSS-3		Not Req.	Attach to R2A.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	NOTES
R3	10KΩ	½	350732	BTS-10K	
R4	120Ω	½	340272	BTS-120	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	NOTES
R5	47Ω	1	370172		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1.9KΩ	3.1Ω	Part of spkr.	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: EMERSON PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3.1Ω	180138	4A07	223S1	

SELENIUM RECTIFIER

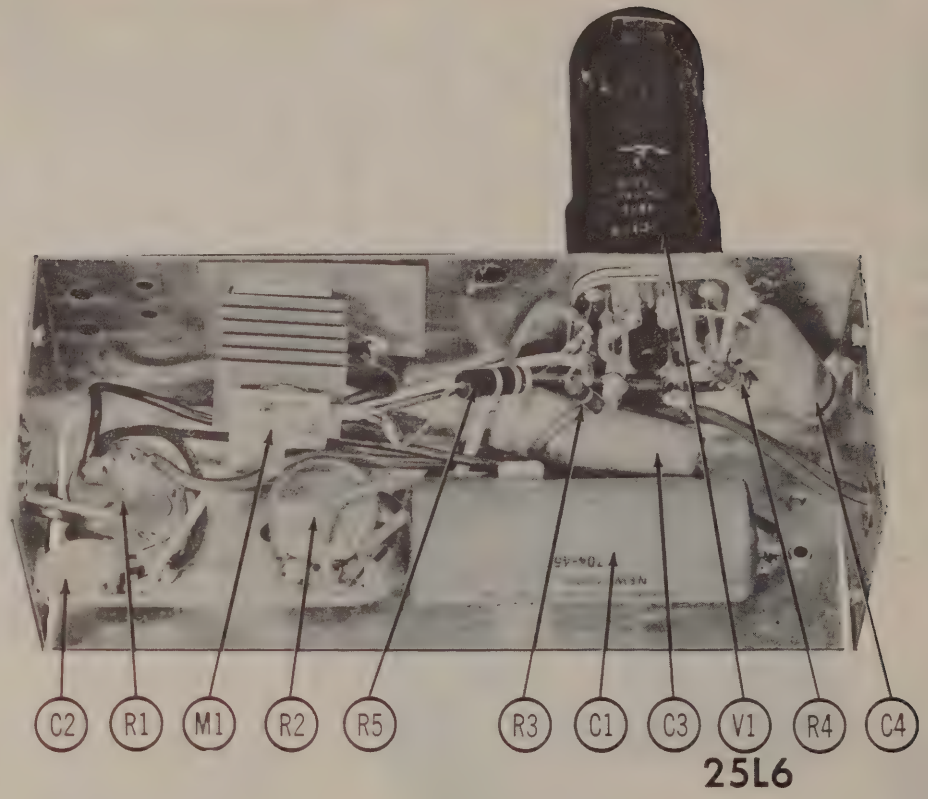
ITEM No.	RATING: CURRENT	REPLACEMENT DATA: EMERSON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.047A	817039	1101A	RS075	6S75	5M4	100A	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: EMERSON PART No.	ASTATIC PART No.: CARTRIDGE	ASTATIC PART No.: NEEDLE	ELECTRO-VOICE PART No.: CARTRIDGE	ELECTRO-VOICE PART No.: NEEDLE	REMARKS
M2	961163	66-TS * P66-T	K and K-78			* Complete tone arm and cartridge assembly.

ASTATIC NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA: EMERSON PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M3	961206 78 Needle 961207 33 1/3-45 Needle	* A-76 or † A-67 or ♦ A-67D * A-76LP or † A-67LP or ♦ A-67LPD		* W-39A *W-39MGA	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M4	Phono Motor	819087	3-Speed
	Cabinet	140697	
	Handle	961210	
	Knob	460668	On-off -volume & tone
	Knob	961208	Turnover Cartridge
	Knob	961209	Speed Control

PHOTOFACT* Folder

GENERAL ELECTRIC MODELS 14T007, 14T008, 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Line)

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GENERAL ELECTRIC MODELS 14T007, 14T008, 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Line)

GENERAL ELECTRIC MODEL 14T007

TRADE NAME	General Electric Models 14T007, 14T008. 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Series")
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	Television Receiver
TUBES	Fourteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.08 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from side panel of cabinet.

2. Remove 6 metal screws and 1 hex nut. Remove rear cover.

3. Disconnect speaker leads. Remove 4 hex nuts. Remove speaker.

4. Disconnect picture tube socket. Remove ion trap and centering device.

5. Loosen yoke clamp, remove screw in the top center of cabinet. (Models with handle, rear handle mounting screw). Remove 2 metal screws on the bottom of cabinet.

6. Tilt chassis out from the right side and at the same time carefully pull the yoke over the neck of the picture tube until chassis is removed. Remove HV lead before chassis is completely removed.

MODELS

14T007, 14T008, 14T009, 14T010,
14T011, 14T012, 14T014 ("M" Series")

GENERAL ELECTRIC MODELS 14T007, 14T008, 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Line)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 2 front bottom screws securing the cabinet front and safety glass. On model with handle, handle will have to be removed. Remove cabinet front by tilting the front out at the bottom. (Use extreme caution when removing safety glass.)

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit may be made with back cover in place. Adjust the horizontal hold slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A7) located on top of chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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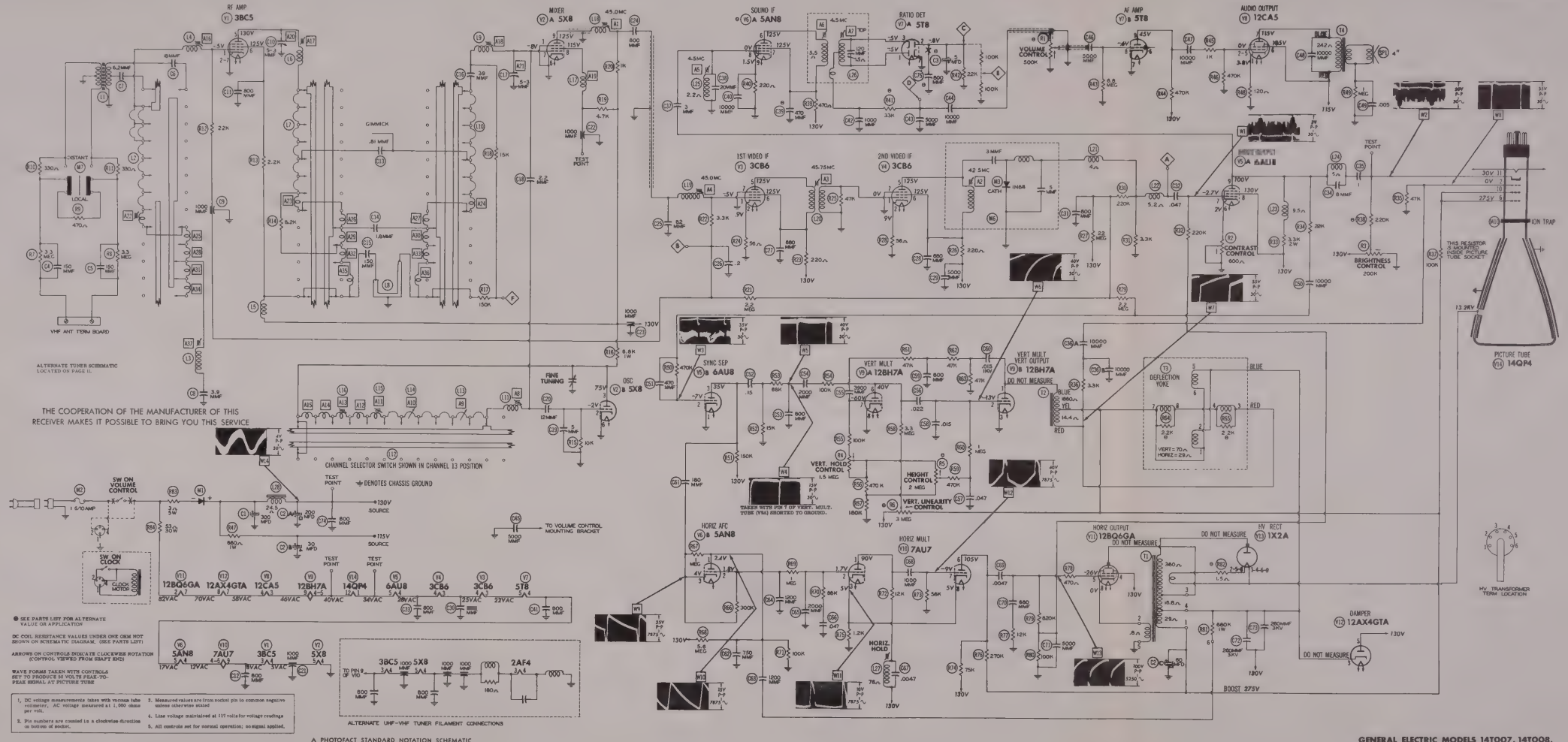
RF AMP V1 3BC5
MIXER V2 A 5X8
SOUND IF V6 A 5AN8
RATIO DET V7 A 5T8
AF AMP V7 B 5T8
AUDIO OUTPUT V8 12CA5
1ST VIDEO IF V7 3CB6
2ND VIDEO IF V4 3CB6
SYNC SEP V5 B 6AU8
VERT MULT V9 A 12BH7A
VERT MULT VERT OUTPUT V9 B 12BH7A
OSC V2 B 5X8
HORIZ AFC V5 B 5AN8
HORIZ MULT V10 7AU7
HORIZ OUTPUT V11 12BQ6GA
HV RECT V13 1X2A
DAMPER V12 12AX4GTA
PICTURE TUBE V16 14QP4
ION TRAP
DEFLECTION YOKE
VOLUME CONTROL 500K
CONTRAST CONTROL 600K
BRIGHTNESS CONTROL 200K
VERT. HOLD CONTROL 1.5 MEG
HEIGHT CONTROL 2 MEG
VERT. LINEARITY CONTROL 3 MEG
HORIZ. HOLD
FINE TUNING
GIMMICK .81 MMF
DISTANT
LOCAL
VHF ANT TERM BOARD
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 11
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
SW ON VOLUME CONTROL
SW ON CLOCK
CLOCK MOTOR
TEST POINT
DENOTES CHASSIS GROUND
130V SOURCE
115V SOURCE
TO VOLUME CONTROL MOUNTING BRACKET
12BQ6GA 12AX4GTA 12CA5 12BH7A 14QP4 6AU8 3CB6 3CB6 5T8
82VAC 70VAC 38VAC 46VAC 40VAC 34VAC 28VAC 25VAC 22VAC
5AN8 7AU7 3BC5 5X8
17VAC 12VAC 6VAC 5VAC
3BC5 5X8 2AF4
TO PIN 9 OF V10
ALTERNATE UHF-VHF TUNER FILAMENT CONNECTIONS
THIS RESISTOR IS MOUNTED INSIDE PICTURE TUBE SOCKET
TAKEN WITH PIN 7 OF VERT. MULT. TUBE (V9A) SHORTED TO GROUND.
DO NOT MEASURE
BOOST 275V
MV TRANSFORMER TERM LOCATION
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied.
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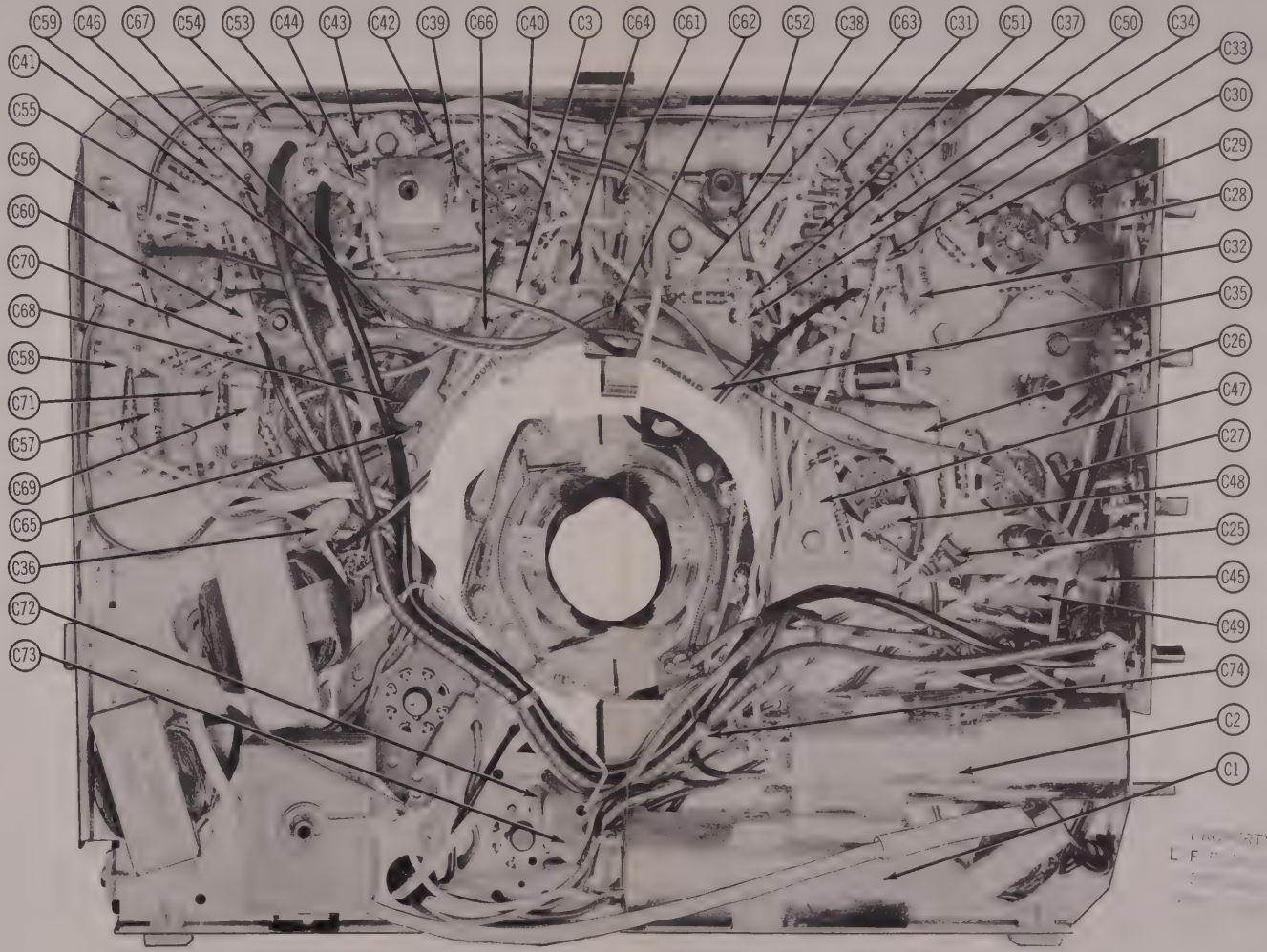
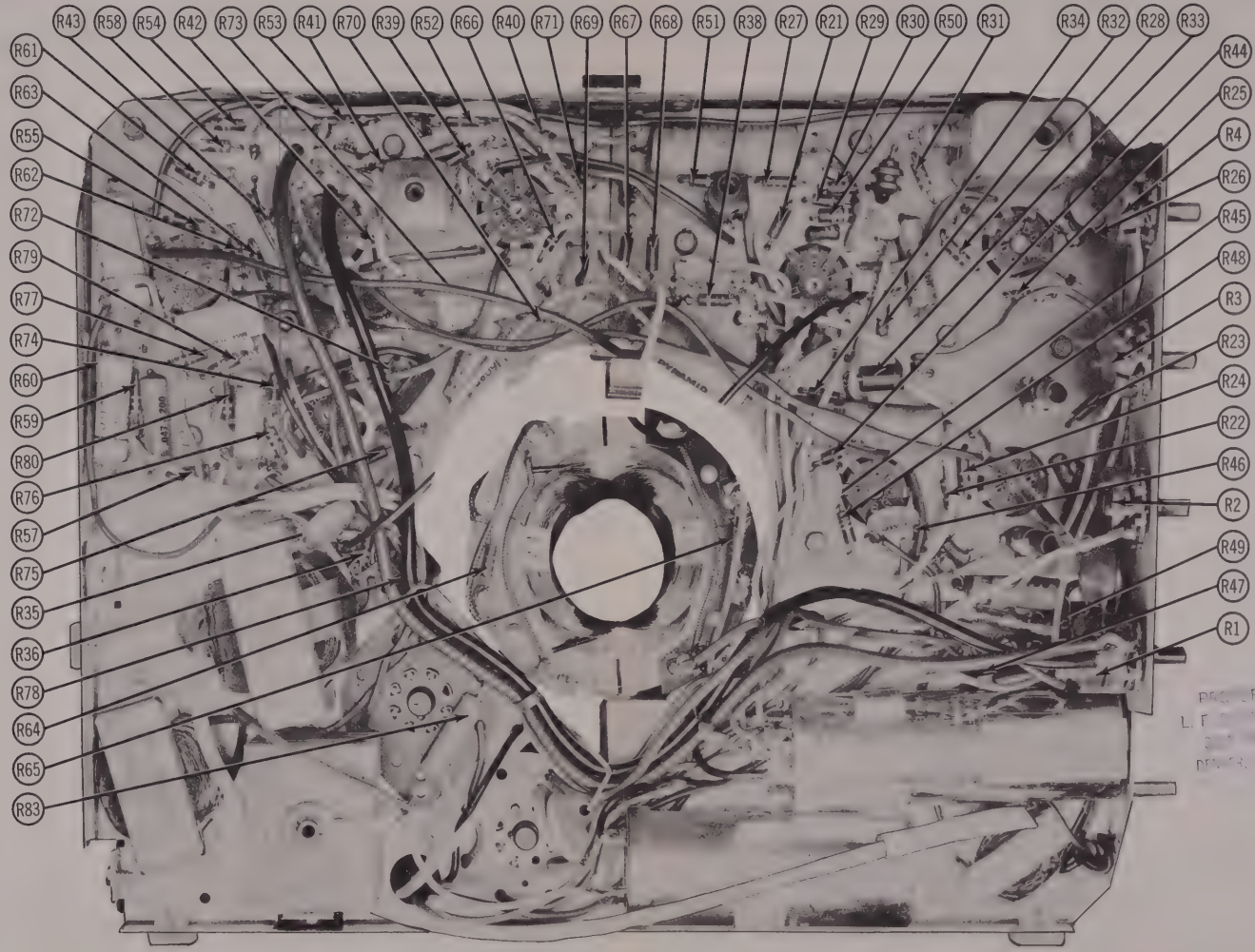


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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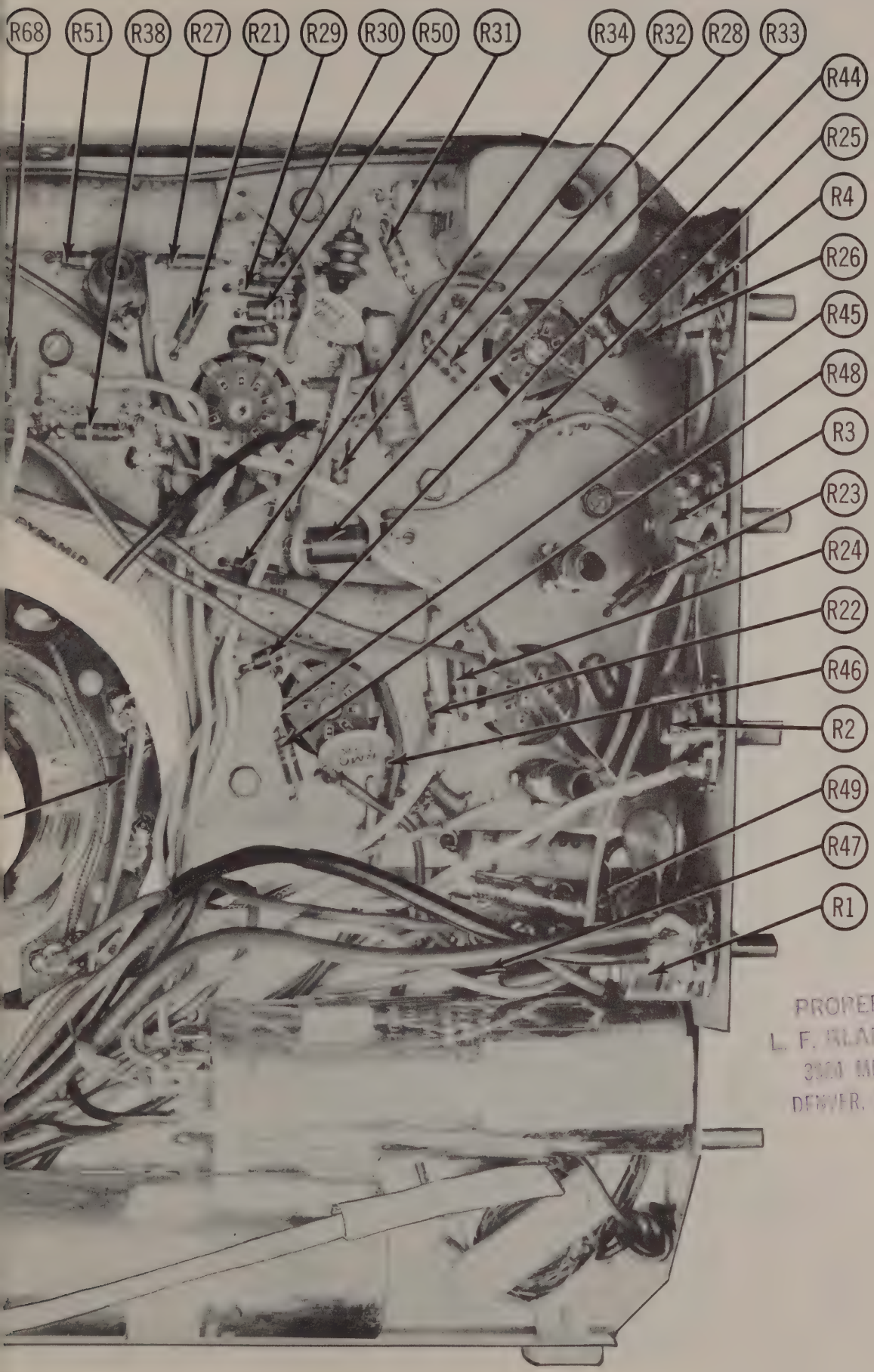

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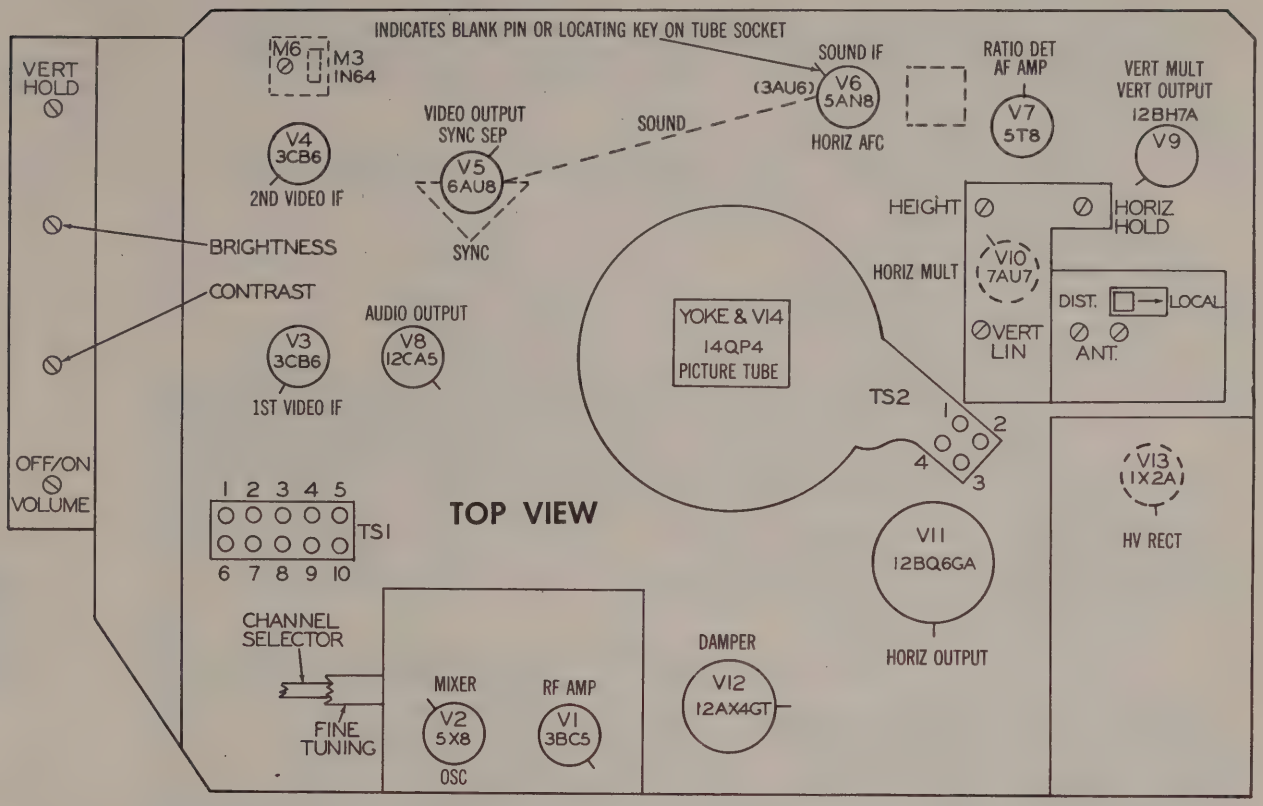
ESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

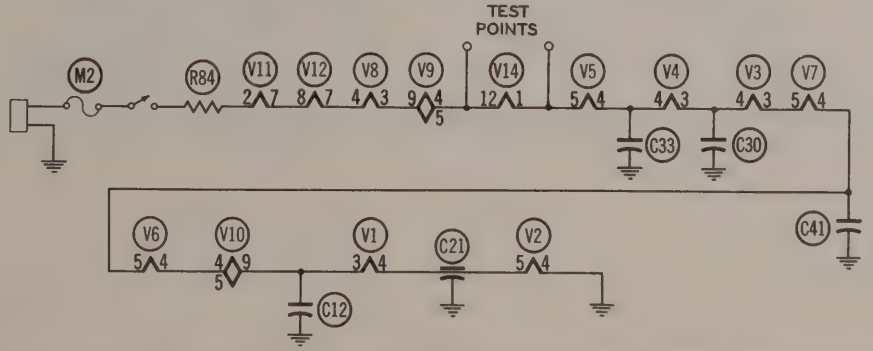
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifier (M1), Fuse (M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V5, V14**
Has pic, no sound - **V6, V7, V8**

SYNC FAILURE
No vert. sync - **V5, V9**
No horiz. sync - **V5, V6, V10**
No vert. or horiz. sync - **V5**

SWEEP FAILURE
No raster, has sound - **V10, V11, V12, V13, V14**
No vertical deflection - **V9**
Poor vert. linearity or foldover - **V9**
Poor horiz. linearity or foldover - **V10, V11, V12**
Narrow picture - **V10, V11, V12, V13, M1**
Vert. off freq. - **V5, V9**
Horiz. off freq. - **V5, V6, V10**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



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ALIGNMENT I

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing cap from plate of the horizontal output tube (V11). Allow a 20 minute warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Turn the volume control fully counterclockwise. Turn the contrast control fully clockwise. Connect the negative lead of a 3 volt battery to point (B). Connect the positive lead to chassis. Calibrate the scope so that 3 volts peak to peak produces two inch vertical deflection. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Note: it is not necessary to perform steps 1 thru 4 unless adjustments A1 thru A4 are far from their proper frequencies. For proper overall desired response step 5 is necessary.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis. Use very short shielded leads.	Not used	45.0MC (Unmod)	Any non-interfering high VHF channel	DC probe thru 10KΩ to point (A). Common to chassis.	A1	Use only enough generator output for usable indication on VTVM. Adjust for maximum deflection.
2.	"	"	"	42.5MC	"	"	A2	"
3.	"	"	"	45.75MC	"	"	A3	"
4.	"	"	"	45.0MC	"	"	A4	"
5.	"	"	44MC (10MC Swp)	41.25MC 42.5MC 45.0MC 45.75MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2, A3, A4	Adjust A1 thru A4 for response curve similar to Fig. 1. Adjust A2 to place 42.5MC marker on low frequency side. Adjust A3 to place 45.75MC marker on high frequency side Adjust A1 and A4 to shape peak region of curve. The 41.25MC sound marker should not be above 9% on response curve.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (E) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A5, A6	Adjust for maximum deflection on VTVM.
7.	"	"	"	"	DC probe to point (D). Common to point (E).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point (C). Low side to chassis.	A5, A6	Disconnect stabilizing capacitor (C3). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A7	Reconnect C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and symmetry of crossover lines.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Follow steps 6 and 7 using station audio instead of 4.5MC signal generator frequency. Connect VTVM in the same procedure.

VHF OSCILLATOR ALIGNMENT FOR VHF TUNERS RJX-078 AND RJX-077

Connect bias as under "Video IF Alignment". Remove the 300Ω transmission line from the input VHF antenna matching transformer (L1). Set the fine tuning knob 2/3 turn from maximum counterclockwise position. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 4	Thru dummy antenna (Fig. 4) across primary of antenna matching transformer (L1).	213MC (10-15MC Swp)	211.25MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A8	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
9.	"	"	207MC (10-15MC Swp)	205.25MC	12	"		Check for response curve as in Fig. 5 with video marker at 45%. If a slight difference is noticed SLIGHTLY readjust A8 to make compromise .
10.	"	"	201MC (10-15MC Swp)	199.25MC	11	"	A9	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
11.	"	"	195MC (10-15MC Swp)	193.25MC	10	"		Check for response curve as in Fig. 5. If a SLIGHT difference is noticed on channel 9 and 10, SLIGHTLY readjust A9. Then recheck as in step 10.
			189MC (10-15MC Swp)	187.25MC	9			
12.	"	"	183MC (10-15MC Swp)	181.25MC	8	"	A10	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
13.	"	"	177MC (10-15MC Swp)	175.25MC	7	"		Check for response curve as in Fig. 5 with video marker at 45%. If a slight difference is noticed SLIGHTLY readjust A10 to make compromise.

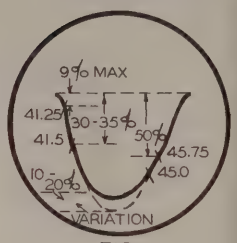
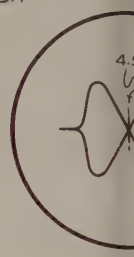
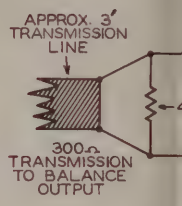


FIG. 1



FIG



FIG

FIG. 5

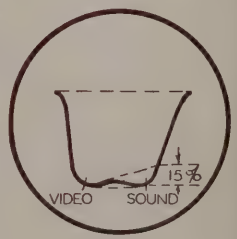


FIG. 7

FIG

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing cap from plate of the horizontal output tube (V11). Allow a 30 minute warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Turn the volume control fully counterclockwise. Turn the contrast control fully clockwise. Connect the negative lead of a 3 volt battery to point Ⓕ. Connect the positive lead to chassis. Calibrate the scope so that 3 volts peak to peak produces two inch vertical deflection. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Note: It is not necessary to perform steps 1 thru 4 unless adjustments A1 thru A4 are far from their proper frequencies. For proper overall desired response step 5 as necessary.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis. Use very short shielded leads.	Not used	45.0MC (Unmod)	Any non-interfering high VHF channel	DC probe thru 10KΩ to point Ⓐ. Common to chassis.	A1	Use only enough generator output for usable indication on VTVM. Adjust for maximum deflection.
2.	"	"	"	43.5MC	"	"	A3	"
3.	"	"	"	45.75MC	"	"	A3	"
4.	"	"	"	45.0MC	"	"	A4	"
5.	"	"	44MC (10MC Swp)	41.25MC 42.5MC 45.0MC 45.75MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1, A2, A3, A4	Adjust A1 thru A4 for response curve similar to Fig. 1. Adjust A3 to place 42.5MC marker on low frequency side. Adjust A3 to place 45.75MC marker on high frequency side. Adjust A1 and A4 to shape peak region of curve. The 41.25MC sound marker should not be above 9% on response curve.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓐ as shown on the schematic

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	Direct	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓔ. Common to chassis.	A5, A6	Adjust for maximum deflection on VTVM.
7.	"	"	"	"	DC probe to point Ⓐ. Common to point Ⓐ.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 130% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point Ⓔ. Low side to chassis.	A5, A6	Disconnect stabilizing capacitor (C3). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A7	Reconnect C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A5 for maximum amplitude and symmetry of crossover lines.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Follow steps 6 and 7 using station audio instead of 4.5MC signal generator frequency. Connect VTVM in the same procedure.

VHF OSCILLATOR ALIGNMENT FOR VHF TUNERS RJX-078 AND RJX-077

Connect bias as under "Video IF Alignment". Remove the 300Ω transmission line from the input VHF antenna matching transformer (L1). Set the fine tuning knob 2/3 turn from maximum counterclockwise position. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 4	Thru dummy antenna (Fig. 4) across primary of antenna matching transformer (L1).	213MC (10-15MC Swp)	211.25MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A8	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
9.	"	"	207MC (10-15MC Swp)	205.25MC	12	"		Check for response curve as in Fig. 5 with video marker at 45%. If a slight difference is noticed SLIGHTLY readjust A8 to make compromise .
10.	"	"	201MC (10-15MC Swp)	199.25MC	11	"	A9	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
11.	"	"	195MC (10-15MC Swp)	193.25MC	10	"		Check for response curve as in Fig. 5. If a SLIGHT difference is noticed on channel 9 and 10, SLIGHTLY readjust A9. Then re-check as in step 10.
			189MC (10-15MC Swp)	187.25MC	9			
12.	"	"	183MC (10-15MC Swp)	181.25MC	8	"	A10	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
13.	"	"	177MC (10-15MC Swp)	175.25MC	7	"		Check for response curve as in Fig. 5 with video marker at 45%. If a slight difference is noticed SLIGHTLY readjust A10 to make compromise.

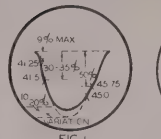


FIG. 1

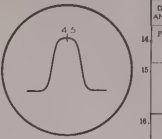


FIG. 2

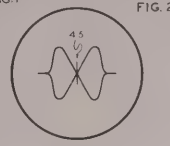


FIG. 3

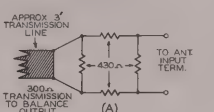
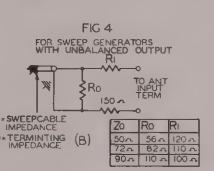


FIG 4



Zo	Ro	Ri
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
90Ω	110Ω	100Ω

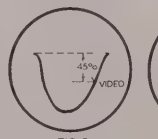


FIG. 5

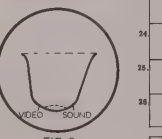


FIG 6

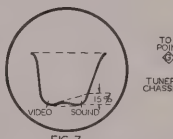


FIG. 7

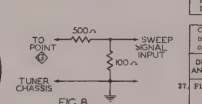


FIG.8

FIG 9

VHF OSCILLATOR ALIGNMENT FOR VHF TUNERS RJX-078 AND RJX-077 (CONT)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Fig. 4.	Thru dummy antenna (Fig. 4) across primary of antenna matching transformer (L1).	85MC (10-15MC Swp)	83.25MC	6	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis	A11	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
15.	"	"	79MC (10-15MC Swp)	77.25MC	5	"	A12	Check for response curve similar to Fig. 5 with video marker at 45% on response curve. If necessary, adjust A12 for desired response A12 is adjusted by expanding or compressing coil turns.
16.	"	"	69MC (10-15MC Swp)	67.25MC	4	"	A13	Adjust so that video marker falls at 45% on response curve as in Fig. 5.
17.	"	"	63MC (10-15MC Swp)	61.25MC	3	"	A14	Check for response curve similar to Fig. 5 with video marker at 45% on response curve. If necessary, adjust A14 for desired response A14 is adjusted by expanding or compressing coil turns.
18.	"	"	57MC (10-15MC Swp)	55.25MC	2	"	A15	Check for response curve similar to Fig. 5 with video marker at 45% on response curve. If necessary, adjust A15 for desired response A15 is adjusted by expanding or compressing coil turns.

VHF RF AND MIXER ALIGNMENT FOR VHF TUNERS RJX-078 AND RJX-077

Connect bias as under "Video IF Alignment". When checking response, tuner shield cover should be in place. Remove the 300Ω transmission line from the input VHF antenna matching transformer (L1). Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Fig. 4	Thru dummy antenna (Fig. 4) across primary of antenna matching transformer (L1)	213MC (10-15MC Swp)	211.25MC 213.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A16, A17, A18, A19	Adjust A16, A17 and A18 for maximum amplitude and symmetry similar to Fig. 6. (In VHF portion of RJX077 tuner A18 is adjusted by knifing coil turns). Band width is adjusted by positioning C15 lead with respect to position of L8. If peaks or the tilt is excessive knife A19 SLIGHTLY so as not to prevent loss of gain.
20.	"	"	177MC (10-15MC Swp)	175.25MC 179.75MC	7	"	A20, A21	Adjust A20 and A21 for maximum amplitude and symmetry similar to Fig. 6. If unable to obtain correct bandwidth or the tilt is excessive adjust the "gimmick" wire over C13. Repeat step 19.
21.	"	"	207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp)	205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC	13 11 10 9 8	"		Check for response similar to Fig. 6 on all channels (7-13). If necessary make compromise adjustments of A20, A21 and "gimmick" over C13 for desired response on all high band channels.
22.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A22, A23, A24	Adjust A22, A23 and A24 for maximum gain on response curve and flatness of top as in Fig. 7. Adjustment is made by knifing coil turns.
23.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A25, A26 A27	Check tracking on channel 5. If necessary knife A25, A26 and A27 (Fig. 7). (Must not be over 15% dif).
24.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A28, A29 A30	Check tracking on channel 4. If necessary, knife A28, A29 and A30. (Must not be over 15% dif). (Fig. 7).
25.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A31, A32, A33	Check tracking on channel 3. If necessary, knife A31, A32 and A33 (Fig. 7). (Must not be over 15% dif.)
26.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A34, A35, A36	Check tracking on channel 2. If necessary, knife A34, A35 and A36 (Fig. 7). (Must not be over 15% dif).

IF INTERFERENCE TRAP ALIGNMENT

A37 is aligned at the factory for approximately 43.5MC. A37 may be readjusted in the field to eliminate any interference between the 40-50MC range. When adjusting this trap core, care should be exercised so that normal channel 2 response is not affected. Adjust A37 for minimum IF channel interference pattern on screen.

40MC CHANNEL ALIGNMENT OF VHF TUNER RJX-077

Connect bias as under "Video IF Alignment". Remove IF output link at junction of L19 and C25 and terminate with a 68Ω carbon resistor at open end. Set tuner knob to "UHF" position. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27.	Fig. 8	High side thru (Fig. 8) network to point Ⓐ. Low side to tuner chassis.	620MC (20MC Swp)	40.5MC 45.75MC	Any UHF channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A38, A39 A40	Adjust for response curve similar to Fig. 9. Adjust A38 and A39 for maximum amplitude. Adjust A40 for maximum gain and zero tilt. Do not allow coils to touch. Disregard possibility of notch caused by the IF trap (A37). Reconnect IF output link to junction of L19 and C25.

UHF TUNER ALIGNMENT

This portion has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

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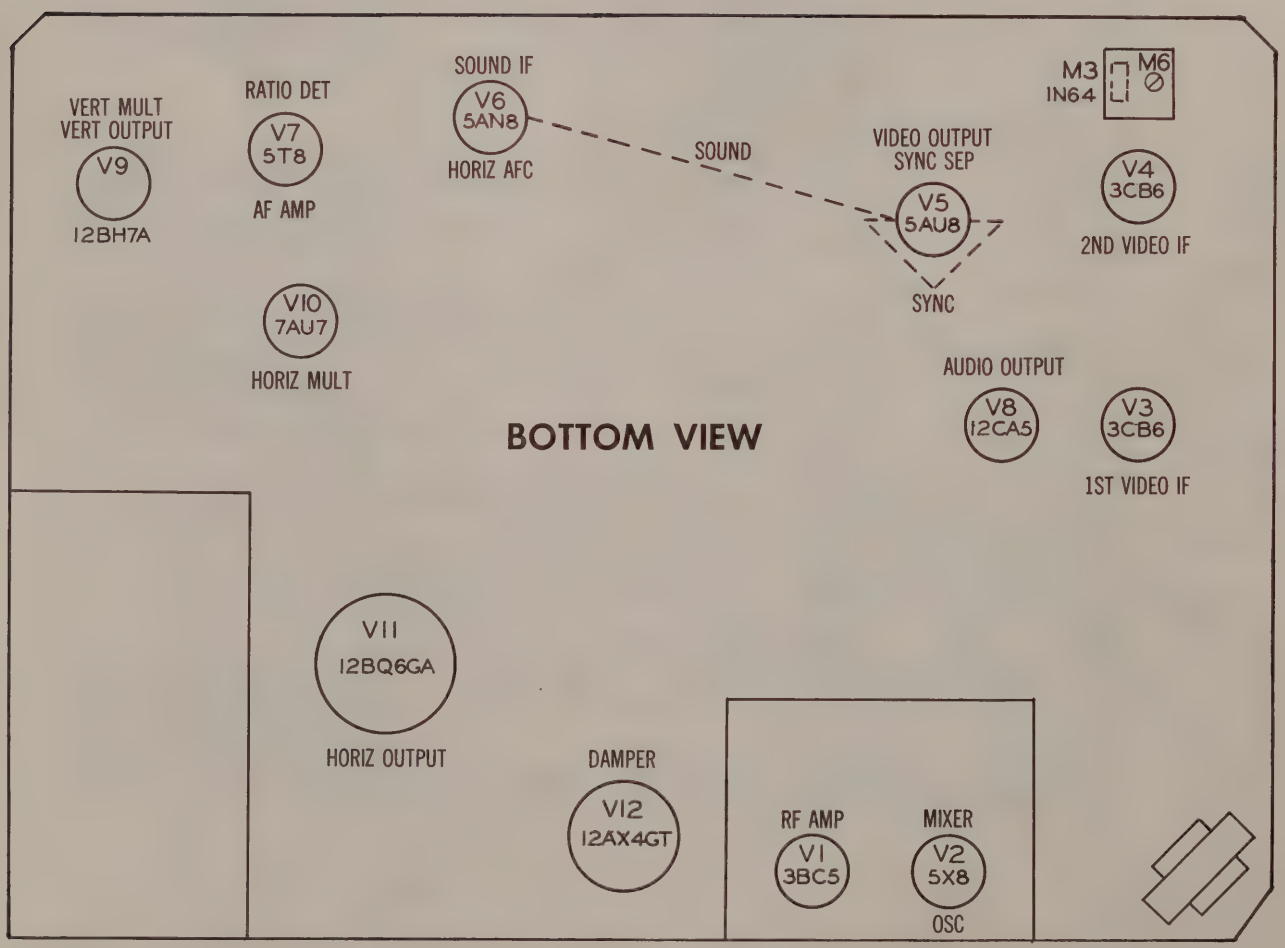
L. F. BLANKENSHIP
3924 MEADE ST.
[illegible], COLORADO

GENERAL ELECTRIC MODELS 14T007, 14T008, 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Line)

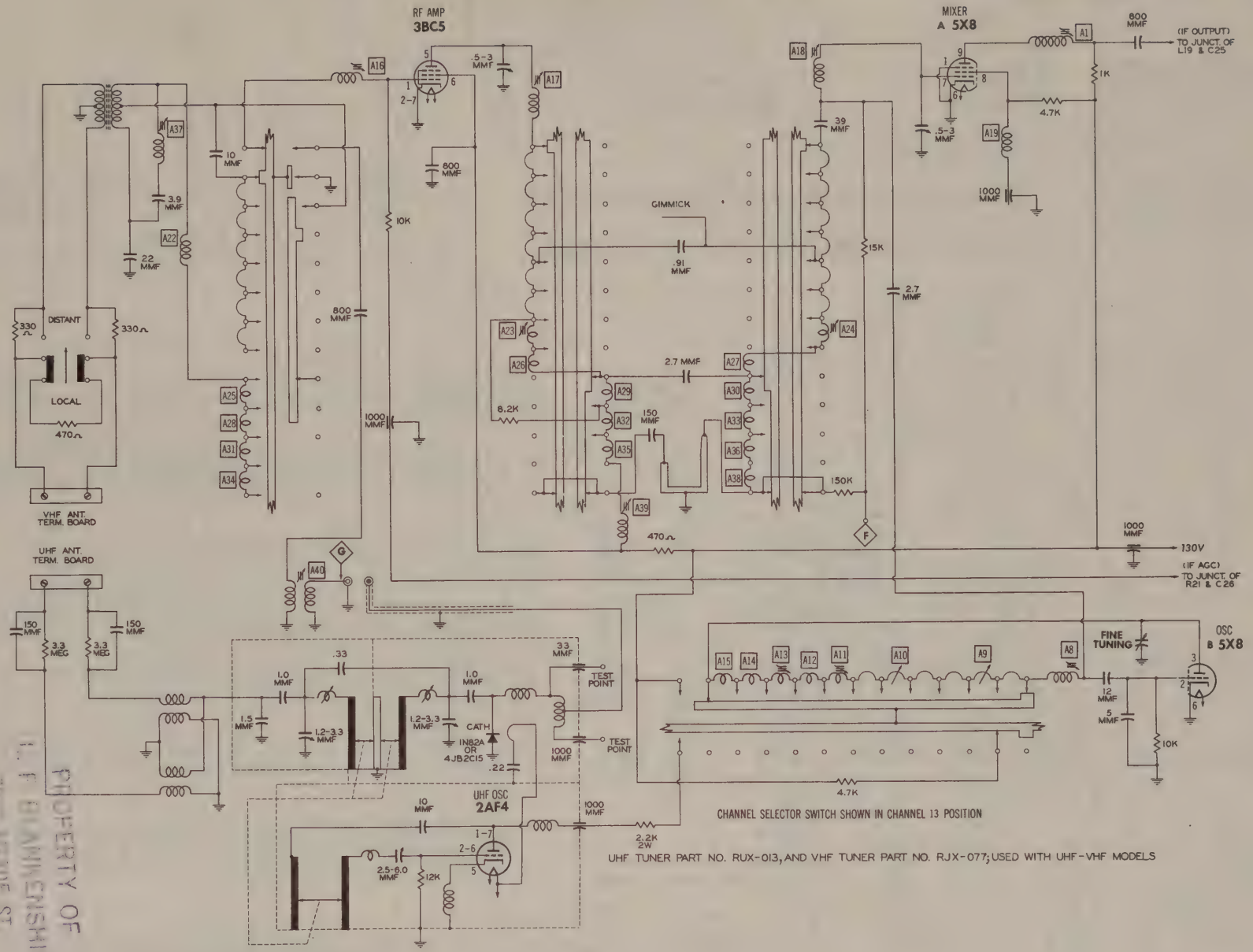
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	3BC5	2. 5Meg	0Ω	2Ω	1Ω	† 24Ω	† 2. 2KΩ	0Ω		
V 2	5X8	0Ω	10KΩ	† 6. 8KΩ	0Ω	1Ω	0Ω	165KΩ	† 4. 7KΩ	† 1KΩ
V 3	3CB6	2. 5Meg	56Ω	5Ω	6Ω	† 245Ω	† 245Ω	0Ω		
V 4	3CB6	. 1Ω	56Ω	6Ω	9Ω	† 245Ω	† 245Ω	0Ω		
V 5	6AU8	0Ω	3Meg	† 150KΩ	9Ω	11Ω	120Ω	320KΩ	† 24Ω	† 3. 3KΩ
V 6	5AN8	100KΩ	1. 5Meg	1Meg	3Ω	4Ω	† 500Ω	† 500Ω	2. 2Ω	220Ω
V 7	5T8	INF	22KΩ	INF	4Ω	5Ω	0Ω	0Ω	6. 8Meg	† 470KΩ
V 8	12CA5	120Ω	470KΩ	14Ω	17Ω	470KΩ	† 680Ω	† 1KΩ		
V 9	12BH7A	▲ 1. 7KΩ	2. 2Meg	0Ω	12Ω	12Ω	▲ 4. 5Meg	1. 5Meg	0Ω	14Ω
V 10	7AU7	† 12KΩ	2. 5Meg	1. 2KΩ	3Ω	3Ω	† 75KΩ	56KΩ	1. 2KΩ	2Ω
V 11	12BQ6GA	NC	22Ω	NC	† 24Ω	1Meg	TP	20Ω	. 8Ω	TOP CAP ▲ 17Ω
V 12	12AX4GTA	NC	NC	170KΩ	NC	† 24Ω	NC	17Ω	20Ω	
V 13	1X2A		PINS	1 - 9	HAVE	INF	RESISTANCE			TOP CAP ▲ 377Ω
V 14	14QP4	11Ω	47KΩ	PIN 6 ▲ 100KΩ	PIN 10 ▲ 100KΩ	PIN 11 † 300KΩ	PIN 12 12Ω			

† MEASURED FROM OUTPUT OF M1.
▲ MEASURED FROM PIN 3 OF V12.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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G. F. BLANKENSHIP
MEADE ST.
DENVER, COLORADO

CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

UHF TUNER PART NO. RUX-013, AND VHF TUNER PART NO. RJX-077; USED WITH UHF-VHF MODELS

UHF-VHF TUNER SCHEMATIC

GENERAL ELECTRIC MODELS 14T007, 14T008, 14T009, 14T010, 14T011, 14T012, 14T014 ("M" Line)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	3BC5	3BC5	
V2	Mixer-Osc.	5X8	5X8	
V3	1st. Video IF Amp.	3CB6	3CB6	
V4	2nd. Video IF Amp.	3CB6	3CB6	
V5	Video Output-Sync Sep.	6AU8	6AU8	
V6	Sound IF Amp.-Horiz. AFC	5AN8	5AN8	3AU6 used in some versions
V7	Ratio Det.-AF Amp.	5T8	5T8	
V8	Audio Output	12CA5	12CA5	
V9	Vert. Mult-Vert. Output	12BH7A	12BH7A	
V10	Horiz. Mult.	7AU7	7AU7	
V11	Horiz. Output	12BQ6GA	12BQ6GA	
V12	Damper	12AX4GTA	12AX4GTA	
V13	HV Rectifier	1X2A	1X2A	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V14	14QP4		14QP4		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	300	150	RCE-218	AFHS1-72	XB007	FP119	TM-300-150	S-115	TVL-1434
C2A	■200	150	RCE-219		XC005	FP229.9	TM-3136	T-065	TVL-3448
B	▲30	150			BR5035	TC68		MT-4550	TVA-1613
C	●60	300							
C3	5	50	(Note 1)	PRS150V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303

Note 1. Some versions use a .47MFD in this application (part #RRC-098).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	150		UCG-032	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C5	150		UCG-032	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C6	18				TCN-18	TN04	N750K-180			
C7	6.2									
C8	3.9									
C9	1000									
C10	.5-3				829-3		3115-01-0R5	CT565A		
C11	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C12	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C13	.81									
C14	1.8									
C15	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C16	39			SI39	DD-390	G031	831-390	UC-5439	5GA-Q39	
C17	.5-3				829-3		3115-01-0R5	CT565A		
C18	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C19	5									
C20	12									
C21	1000									
C22	1000									
C23	1000									
C24	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C25	82			SI82	D6-820	G040	GP1K-820		5GA-Q82	
C26	.2	200	UCC-050	P288N-22		CUB2P22		PT4022	2TM-P22	
C27	680		RCW-3051	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C28	680		RCW-3051	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C29	5000		RCW-3014	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C31	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C32	.047	200	RCC-122	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C33	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C34	8		RCW-2009							
C35	.1	400	RCN-031	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C36A	10000		RCN-104	BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C37	3		RCW-1066	NP0-SI3.3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C38	20		RCG-007	NP0-SI20	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C39	470		RCW-3224	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C40	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C41	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C42	1000		RCW-3213	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C43	5000		RCW-3014	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-521	5HK-S1	
C45	5000		RCW-3014	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C46	5000		RCW-3014	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C47	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C48	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	.005	600	UCC-039	SI5000	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C50	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C51	470		RCW-3097	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C52	.15	400	RCN-074	P488N-15		CUB4P15		PT4015	4TM-P15	
C53	800		RCW-3184	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C54	2000		RCW-3215	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C55	3900		RCW-3185	1464-0039		1R5D39		MCB463	MS-239	
C56	.022	600	RCN-092							
C57	.047	200	RCC-122	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C58	.015	600	RCN-068							
C59	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C60	.015	1000	RCN-105							
C61	180		RCW-3212	SI180	D6-181	TP37	GP2K-181		5GA-T18	
C62	750		RCW-3211	1464-00075	D6-751	1R5T75	811-751		MS-375	
C63	1200		RCW-3187	1464-0012		1R5D12			MS-212	
C64	1200		RCW-3187	1464-0012		1R5D12			MS-212	
C65	2000		RCW-3215	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C66	.047	200	RCC-122	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C67	.0047	600	RCN-083	1464-0047		1R5D47		MCB465	MS-247	
C68	1000		RCG-004	1464-001		1R5D1		MCE255	MS-21	
C69	.0047	600	RCN-083	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C70	680		RCW-3051	SI680	D6-681	TP50	811-681		5GA-T68	
C71	5000		RCW-3014	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C72	260	3000	RCW-3225							
C73	260	3000	RCW-3225							
C74	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C75	800		RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	Note 2

Note 2. Not used in some versions.

PARTS LIST AND CONTR

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMENT: General Electric PART No.	REPLACEMENT: CENTRALAB PART No.	REPLACEMENT: CLAROSTA PART No.
R1A	500KΩ	½	RRC-336	AB-60	A47-500K-2
B	Shaft		Not Req.	AK-3	FS-3
C	Switch		Not Req.	KB-1	SWE-12
R2A	600Ω	½	RRC-338	AB-415	
B	Shaft		Not Req.	AK-3	
R3A	200KΩ	½	RRC-339	B-46	A47-200K-
B	Shaft		Not Req.	Not Req.	FS-3
R4A	1. 5Meg	½	RRC-337	AB-742	A47-1.5Meg
B	Shaft		Not Req.	AK-3	FS-3
R5A	2Meg	½	RRC-311	BX-75	A47-2Meg-
B	Shaft		Not Req.	Not Req.	FKS-1/4
R6A	3Meg	½	RRC-301	BX-84	A47-3Meg-
B	Shaft		Not Req.	Not Req.	FKS-1/4

Note 1. Used in Models 14007, 14008, and 14009, General Electric
Note 2. It is necessary to replace twin control unit with 2 standar in some versions.

RESISTO

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	3. 3Meg	½	URD-133	BTS-3. 3Meg	
R8	3. 3Meg	½	URD-133	BTS-3. 3 Meg	
R9	470Ω	½	URD-041	BTS-470	
R10	330Ω	½	URD-037	BTS-330	
R11	330Ω	½	URD-037	BTS-330	
R12	22KΩ	½		BTS-22K	
R13	2200Ω	½		BTS-2200	
R14	8200Ω	½			
R15	10KΩ	½			
R16	6800Ω	1			
R17	150KΩ	½			
R18	15KΩ	½			
R19	4700Ω	½			
R20	1000Ω	½		BTS-1000	
R21	2. 2Meg	½	URD-129	BTS-2. 2Meg	
R22	3300Ω	½	URD-061		
R23	220Ω	½	URD-033	BTS-220	
R24	56Ω	½	URD-019	BTS-56	
R25	47KΩ	½	URD-089		
R26	220Ω	½	URD-033	BTS-220	
R27	22Meg	½	RRD-004		
R28	56Ω	½	URD-019	BTS-56	
R29	2. 2Meg	½	URD-129	BTS-2. 2Meg	
R30	220KΩ	½	URD-105	BTS-220K	
R31	3300Ω	½	URD-061	BTS-3300	
R32	220KΩ	½	URD-105	BTS-220K	
R33	3300Ω	2	URF-061	BTB-3300	
R34	22KΩ	½	URD-081	BTS-22K	
R35	47KΩ	½	URD-089	BTS-47K	
R36	3300Ω	½	URD-061	BTS-3300	
R37	100KΩ	½	URD-097	BTS-100K	
R38	220KΩ	½	URD-105	BTS-220K	Note 1
R39	470Ω	½	URD-041	BTS-470	
R40	220Ω	½	URD-033	BTS-220	
R41	33KΩ	½		BTS-33K	Note 2
R42	22KΩ	½	URD-081	BTS-22K	
R43	6. 8Meg	½	URD-141	BTS-6. 8Meg	
R44	470KΩ	½	URD-113	BTS-470K	
R45	1000Ω	½	URD-049	BTS-1000	

Note 1. Some versions use a 330KΩ ½W resisto
Note 2. Some versions use a 22KΩ ½W resistor
Note 3. Not used in some versions.

TRANSFORMERS (S

ITEM No.	USE	General Electric PART No.	Halldorson PART No.	Merit PART No
T1	Horiz. Output Trans.	RTO-175		
T2	Vert. Output Trans.	RTO-167	Z1804	A-3037
T3A	Yoke (90°) Horiz. (12MH)	RLD-073		
B	Vert. (41. 5MH)			

TRANSFORMER (A

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DA: General Electric PART No.	Halldorson PART No.	Merit PART No.	S PA
T4	3.7KΩ	3. 4Ω	RTO-178		A-2998	

SPEAK

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT D: General Electric PART No.	QUAM PART No.
SP1	4"	PM	3. 4Ω	ROP-033	4A07

COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REP: General Electric PART No.	MEIS PART
L1	Ant. Matching CTrans.	.2ΩCT	.1Ω *		
L2	Ant. Coils	0Ω			
L3	IF Trap				
L4	Ant. Coil	0Ω			
L5	RF Choke	0Ω			
L6	RF Coil	0Ω			
L7	RF Coils	0Ω			
L8	Hi-Band Coupling Strap	0Ω			
L9	Mixer Grid Coil	0Ω			
L10	Mixer Grid Coils	0Ω			
L11	Osc. Coil	0Ω			
L12	Osc. Coils	0Ω			
L13	Osc. Coil	0Ω			

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	3BC5	3BC5	
V2	Mixer-Osc.	5X8	5X8	
V3	1st. Video IF Amp.	3CB6	3CB6	
V4	2nd. Video IF Amp.	3CB6	3CB6	
V5	Video Output-Sync Sep.	6AU8	6AU8	
V6	Sound IF Amp.-Horiz. AFC	5AN8	5AN8	5AU8 used in some versions
V7	Ratio Det.-AF Amp.	5T8	5T8	
V8	Audio Output	12CA5	12CA5	
V9	Vert. Mult-Vert. Output	12BH7A	12BH7A	
V10	Horiz. Mult.	7AU7	7AU7	
V11	Horiz. Output	12BQ6GA	12BQ6GA	
V12	Damper	12AX4GTA	12AX4GTA	
V13	HV Rectifier	1X2A	1X2A	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: General Electric PART No	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V14	14QP4		14QP4		

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	300	150	RCE-128	AFBBI-73	XB007	FP19	TM-300-150	S-115	TVL-1434
C2A	▲300	150	RCE-219		BC005	FP238.9	TM-3158	T-765	TVL-3448
B	▲30	150			BR5035	TC88		MT-4550	TVA-1613
C	▲50	300							
C3	5	50	(Note 1)	PRS150V4	BR590	TC30	TD-5-50	MMT-0505	TVA-1305

Note 1. Some versions use a .47MFD in this application (part #RRC-098).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C5	150			UCG-032	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C6	18					DD-180	G046	811-180			
C7	6.2									
C8	3.9									
C9	1000									
C10	.5-3			829-3			3115-01-0R5	CT565A		
C11	500			BPD-0008	DD-801	K067	831-501	DC-531	5GA-T8	
C12	500			BPD-0008	DD-801	K067	831-501	DC-531	5GA-T8	
C13	.01									
C14	1.5									
C15	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C16	39			B239	DD-390	G031	831-390	UC-5439	5GA-Q39	
C17	.5-3				829-3		3115-01-0R5	CT565A		
C18	3.3			MP0-SI3.3	TCZ-3R3	TZ05	MP0A-3R3		5TCCB-V22	
C19	5									
C20	12									
C21	1000									
C22	1000									
C23	1000									
C24	820				BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C25	82				SI83	DE-820	G040	GPIK-820		5GA-Q82
C26	.2	200		UCC-050	P2S5N-Z2		CUBZP23		PT4023	5TM-P23
C27	680			RCW-3051	SI680	DE-681	TP50	GP2K-681	UC-5368	5GA-T68
C28	680			RCW-3051	SI680	DE-681	TP50	GP2K-681	UC-5368	5GA-T68
C29	5000			RCW-3084	BPD-005	DD-503	K080	811-005	DC-535	5HK-D5
C30	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C31	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C32	.047	200		RCC-123	BPD-05	DF-503	CUBZ847		PT4i47	5TM-S47
C33	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C34	8			RCW-3069						
C35	.1	400		RCN-231	P488N-1	DF-104	CUB4P1		PT401	47M-P1
C36A	10000			RCN-104	BPD-2X01	DD8-103	DK062	811-01	DC-511	5HK-Z01
B	10000							811-01	DC-511	
C37	3			RCW-1066	NPO-SI3.3	TCZ-3R3	TZ05	NP0A-030	ZT-553	5TCCB-V33
C38	20			RCW-3107	NPO-SI20	TCZ-200	TZ15	NP0K-200	ZT-563	5TCC-Q2
C39	470			RCW-3224	SI470	DE-471	TP46	GP3K-471	UC-5347	5GA-T47
C40	10000			RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-01
C41	500			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C42	1000			RCW-3213	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1
C43	5000			RCW-3014	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5
C44	10000			RCW-3186	BPD-01	DD-103	K082	811-01	DC-521	5HK-S1
C45	5000			RCW-3014	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5
C46	5000			RCW-3014	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5
C47	10000			RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1
C48	10000			RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1
C49	.005	600		UCC-039	SI5O0	DE-502	CUB5D5	GP3-333-502	PT525	5TM-D5
C50	10000			RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1
C51	.047			RCW-3107	SI470	DE-471	TP46	GP3K-471	UC-5347	5GA-T47
C52	.15	400		RCN-074	P488N-15			CUB4P15	PT4015	47M-P15
C53	800			RCW-3184	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C54	2000			RCW-3215	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2
C55	3900			RCW-3185	1464-0039		UR5D39		MC3693	MS-239
C56	.033	600		RCN-093						
C57	.047	200		RCC-122	BPD-05	DF-503	CUBZ847		PT4i47	5TM-S47
C58	.015	800		RCN-096						
C59	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C60	.015	1000		RCN-105						
C61	150			RCW-3212	SI50	DE-151	TP37	GP2K-151		5GA-T15
C62	750			RCW-3211	1464-00075	DE-751	UR5T75	811-751		MS-375
C63	1200			RCW-3187	1464-0012		UR5D12			MS-312
C64	1200			RCW-3187	1464-0012		UR5D12			MS-312
C65	2000			RCW-3215	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2
C66	.047	300		RCC-123	BPD-05	DF-503	CUBZ847		PT4i47	5TM-S47
C67	.0047	600		RCN-083	1464-0047		UR5D47		MCB465	MS-347
C68	1000			RCG-004	1464-001		UR5D1		MCE255	MS-21
C69	.0047	600		RCN-083	SI4700	DE-472	CUB5D47	GP2-333-472	PT6347	5TM-D47
C70	680			RCW-3051	SI680	DE-681	TP50	811-681		5GA-T68
C71	5000			RCW-3014	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5
C72	360	3000		RCW-3225						
C73	360	3000		RCW-3225						
C74	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-531	5GA-T8
C75	800			RCW-3037	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8 Note 2

Note 2. Not used in some versions.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RRC-336	A8-50	A43-500K-2	Q13-133	U-48	Volume-See Note 1
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWS-12	T2-1	U5-26	Attach to R1A.
R2A	500Ω	½	RRC-338	A8-A15		Q17-105	U-3	Contrast
B	Shaft		Not Req.	AK-3		Not Req.	Not Req.	Attach to R1A.
R3A	200KΩ	½	RRC-339	B-46	A47-200K-5	Q11-129	U-43	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
R4A	1.5MegΩ	½	RRC-327	AB-742	A45-1.5Meg-5	Q11-139	TA165L	Vertical Hold
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R4A.
R5A	2Meg	½	RRC-311	BX-75	A47-2Meg-S	Q11-139	TA26L	Height
B	Shaft		Not Req.	Not Req.	FXS-1/4	TQ	Not Req.	Attach to R5A Single Unit
R6A	3Meg	½	RRC-301	BX-84	A47-3Meg-S	Q11-140	TA36L	Vertical Linearity See Note 2
B	Shaft		Not Req.	Not Req.	FKS-1/4	TQ	Not Req.	Attach to R6A.

Note 1. Used in Models 14007, 14008, and 14009, General Electric Part No. RRC-340 used in Model 14T10L.
Note 2. It is necessary to replace two control unit with 2 matched type controls (Height and vertical Linearity). Not used in some versions.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	3.3Meg	½	URD-133	BTS-3.3Meg	
R8	3.3Meg	½	URD-133	BTS-3.3Meg	
R9	470Ω	½	URD-041	BTS-470	
R10	330Ω	½	URD-037	BTS-330	
R11	330Ω	½	URD-037	BTS-330	
R12	22KΩ	½		BTS-22K	
R13	2200Ω	½		BTS-2200	
R14	680Ω	½			
R15	10KΩ	½			
R16	6800Ω	1			
R17	150KΩ	½			
R18	15KΩ	½			
R19	4700Ω	½			
R20	1000Ω	½		BTS-1000	
R21	2.2Meg	½	URD-129	BTS-2.2Meg	
R23	3300Ω	½	URD-061	BTS-3300	
R23	220Ω	½	URD-033	BTS-220	
R24	56Ω	½	URD-019	BTS-56	
R25	47KΩ	½	URD-089		
R26	220Ω	½	URD-033	BTS-220	
R27	22Meg	½	RRD-004		
R28	56Ω	½	URD-019	BTS-56	
R29	2.2Meg	½	URD-129	BTS-2.2Meg	
R30	2KΩ	½	URD-105	BTS-2K	
R31	3300Ω	½	URD-061	BTS-3300	
R32	220KΩ	½	URD-105	BTS-220K	
R33	3300Ω	2	URF-061	BTS-3300	
R34	22KΩ	½	URD-081	BTS-22K	
R35	47KΩ	½	URD-089	BTS-47K	
R36	3300Ω	½	URD-061	BTS-3300	
R37	100KΩ	½	URD-097	BTS-100K	
R38	220KΩ	½	URD-105	BTS-220K	Note 1
R39	470Ω	½	URD-041	BTS-470	
R40	220Ω	½	URD-033	BTS-220	
R41	33KΩ	½	URD-085	BTS-33K	Note 2
R42	22KΩ	½	URD-081	BTS-22K	
R43	6.8Meg	½	URD-141	BTS-6.8Meg	
R44	470KΩ	½	URD-113	BTS-470K	
R45	1000Ω	½	URD-049	BTS-1000	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R46	470KΩ	½	URD-113	BTS-470K	
R47	680Ω	½	URE-045	BTA-680	
R48	120Ω	½	URD-021	BTS-120	
R49	1Meg	½	URD-121	BTS-1Meg	
R50	470KΩ	½	URD-113	BTS-470K	
R51	150KΩ	½	URD-101	BTS-150K	
R52	18KΩ	½	URD-077	BTS-18K	
R53	68KΩ	½	URD-093	BTS-68K	
R54	100KΩ	½	URD-097	BTS-100K	
R55	100KΩ	½	URD-097	BTS-100K	
R56	470KΩ	½	URD-113	BTS-470K	
R57	180KΩ	½	URD-103	BTS-180K	
R58	3.3Meg	½	URD-133	BTS-3.3Meg	
R59	470KΩ	½	URD-131	BTS-470K	
R60	1Meg	½	URD-121	BTS-1Meg	
R61	47KΩ	½	URD-089	BTS-47K	
R62	47KΩ	½	URD-089	BTS-47K	
R63	47KΩ	½	URD-089	BTS-47K	
R64	2200Ω	½			Note 3
R65	2200Ω	½			Note 3
R66	390KΩ	5%	URD-1108		
R67	1Meg	½	URD-121		
R68	5.6Meg	½	URD-139	BTS-5.6Meg	
R69	1Meg	½	URD-121		
R70	68KΩ	½	URD-093		
R71	100KΩ	½	URD-097	BTS-100K	
R72	12KΩ	½	URD-075		
R73	56KΩ	½	URD-1081		
R74	75KΩ	5%	URD-1094		
R75	1200Ω	5%	URD-1081		
R76	470KΩ	½	URD-107	BTS-470K	
R77	12KΩ	½	URD-075		
R78	47KΩ	½	URD-041		
R79	820KΩ	½	URD-119		
R80	100KΩ	½	URD-097		
R81	680KΩ	½	URE-045		
R82	1.5Ω	5	RRW-136	BW½-1.5	Note 3
R83	3Ω	5	RRW-137	PW7-3	
R84	53Ω	30	RRW-138		

Note 1. Some versions use a 330KΩ ½W resistor in this application (Mfgr. Part No. URD-109).
Note 2. Some versions use a 22KΩ ½W resistor in this application (Mfgr. Part No. URD-081).
Note 3. Not used in some versions.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	Horiz. Output Trans.	RTO-175							
T2	Vert. Output Trans.	RTO-187	Z1804	A-3037	222T1	V313	A-8123	26852	A-102X
T3A	Yoke (90°) Horiz. (110°)	RLD-073							
B	Vert. (41.5MΩ)								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	IMPEDANCE: SEC	REPLACEMENT DATA: General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T4	3.7KΩ	3.4Ω	RTO-176		A-3988				

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP	REPLACEMENT DATA: General Electric PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3.6Ω	ROP-033	4A07	22381	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching CTrans.	.2DCT	.1Ω *					* Tapped
L2	Ant. Coils	0Ω						
L3	IF Trap							
L4	Ant. Coil	0Ω						Channel 13
L5	RF Choke	0Ω						
L6	RF Coil	0Ω						Channel 13
L7	RF Coils	0Ω						
L8	Hi-Band Coupling	0Ω						
	Strap	0Ω						
L9	Mixer Grid Coil	0Ω						Channel 13
L10	Mixer Grid Coils	0Ω						
L11	Osc. Coil	0Ω						Channel 13
L12	Osc. Coils	0Ω						
L13	Osc. Coil	0Ω						Channel 11

COILS (cont)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: General Electric PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L14	Osc. Coil	0Ω						Channel 8
L15	Osc. Coil	0Ω						Channel 6
L16	Osc. Coil	0Ω						Channel 4
L17	RF Coil	0Ω						
L18	Coup. Plate	.2Ω						
L19	1st Video IF	.3Ω		RLI-336				
L20	2nd Video IF	.3Ω	.1Ω	RTL-185				
L21	Series Peaking Coil	4Ω		RLI-340	19-1004		4620	5.6 Microhenries, IRC Part No. CLA
L22	Series Peaking Coil	5.2Ω		RLI 317	19-3100	TV-181	6113	100 Microhenries
L23	Shunt Peaking Coil	9.5Ω		RLI-194	19-3300	TV-190	6123	330 Microhenries
L24	Series Peaking Coil	5Ω		RLI-305	19-3128		6153	130 Microhenries
L25	Sound IF	2.3Ω		RLI-339				
L26	Ratio Det.	5.5Ω	1.5OCT	RTO-250	17-3497	TV-18	6306	Tertiary Winding-.5Ω

* Use our winding only.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES: PRI.	DC RES: SEC.	REPLACEMENT DATA: General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rem PART No.	Thordorson PART No.	NOTES
L27	78Ω		RLI-339							

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (@ CURRENT 1000 MA)	REPLACEMENT DATA: General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L28	240ADC	24.5Ω	.78HY	RLF-075					

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: General Electric PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.240ADC	RER-015	1236A	MR-250	82500	5QSI	350A	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: General Electric PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER
M2	3AG 8/B 9/T	1.6AA	RRF-034		312.01.6 (3AG 8/B 9/T 1.6AA)		MDV1.6/6	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: General Electric PART No.	SYLVANIA PART No.	NOTES
M3	1N64	RRD-001	1N60 or 1N132	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M4	Tuner	RJX-078	VHF-Used in VHF Models only.
	Tuner	RJX-077	VHF-Used in VHF-UHF Models.
M5	Tuner	RUX-013	UHF-Used in VHF-UHF Models.
M6	Video Det. Assy.	RLI-337	Includes M3 & Coils; Does not include 3MMF Cap. (Part No. RCG-005) & 5MMF Cap. (Part No. RCW-3057). Local-distant (DPDT-Slide Type)
M7	Switch	RSS-008	Model 14T000 only.
M8	Clock	RZC-058	
M9	Centering Device	REA-008	
M10	Ion Trap	RET-012	
	Cabinet	RAC-171	Front-Model 14T007
	Cabinet	RAC-172	Front-Model 14T008
	Cabinet	RAC-173	Front-Model 14T009
	Cabinet	RAC-174	Front-Model 14T010
	Cabinet	RAV-287	Rear-Model 14T007
	Cabinet	RAV-288	Rear-Model 14T008
	Cabinet	RAV-289	Rear-Model 14T009
	Cabinet	RAV-290	Rear-Model 14T010
	Escutcheon	RAH-004	Clock-Model 14T010
	Cover	RAC-176	Clock-Model 14T010
	Handle	RHY-072	Model 14T008, 14T009
	Knob	RDK-490	Fine Tuning
	Knob	RDK-517	Control (4 used)-Model 14T007
	Knob	RDK-518	Control (4 used)-Model 14T010
	Knob	RDK-519	Control (4 used)-Model 14T008
	Knob	RDK-520	Control (4 used)-Model 14T009
	Knob	RDK-521	VHF Channel Selector-Model 14T010
	Knob	RDK-523	VHF Channel Selector-Model 14T008
	Knob	RDK-524	VHF Channel Selector-Model 14T007
	Knob	RDK-527	VHF Channel Selector-Model 14T009
	Knob	RDK-522	UHF Dial-Models 14T007, 14T010
	Knob	RDK-525	UHF Dial-Model 14T008
	Knob	RDK-526	UHF Dial-Model 14T009
	Knob	RZK-024	Clock-Model 14T010
	Crystal	RZW-028	Clock-Model 14T010
	Safety Glass	RDW-100	

PROPERTY OF
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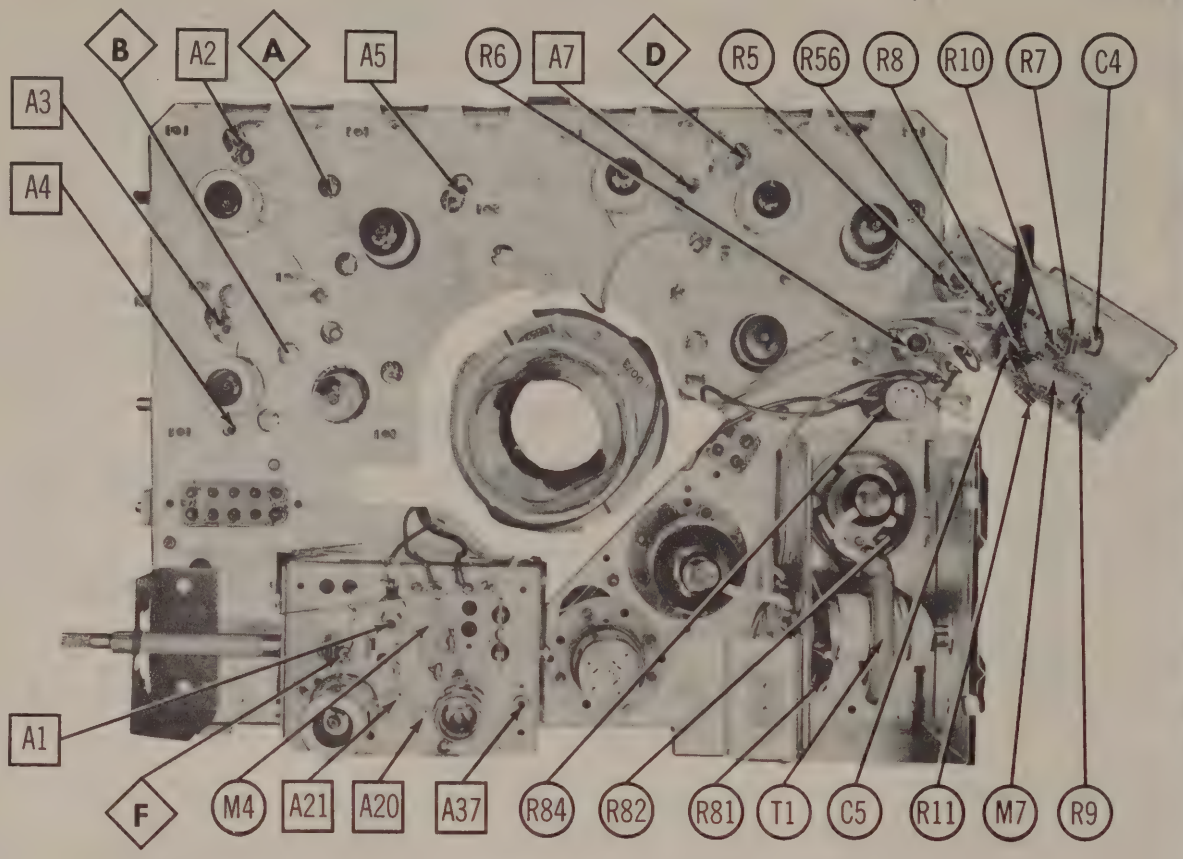
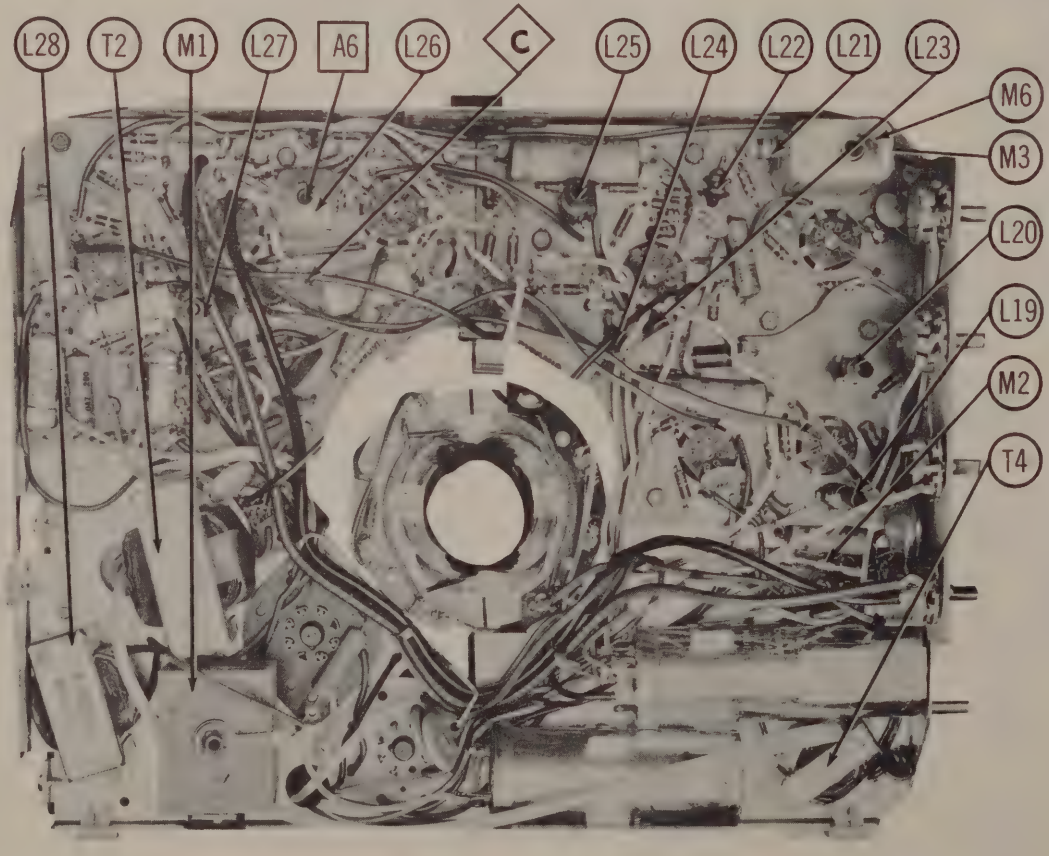
3924 MEADE ST.
DENVER, COLORADO



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PRODUCTION CHANGES

In later production the following changes were made.

TO REDUCE AUDIO BUZZ

An 800 MMF capacitor (C75) is added from pin 2 to pin 7 of V7.

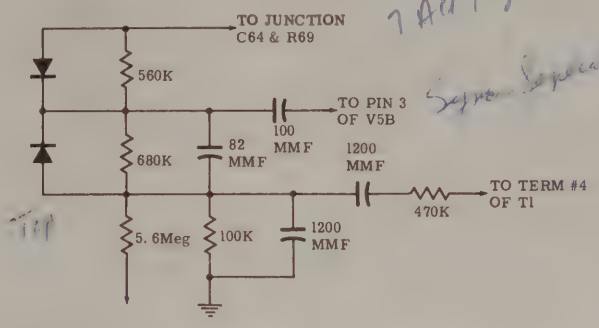
COMPONENT CHANGE

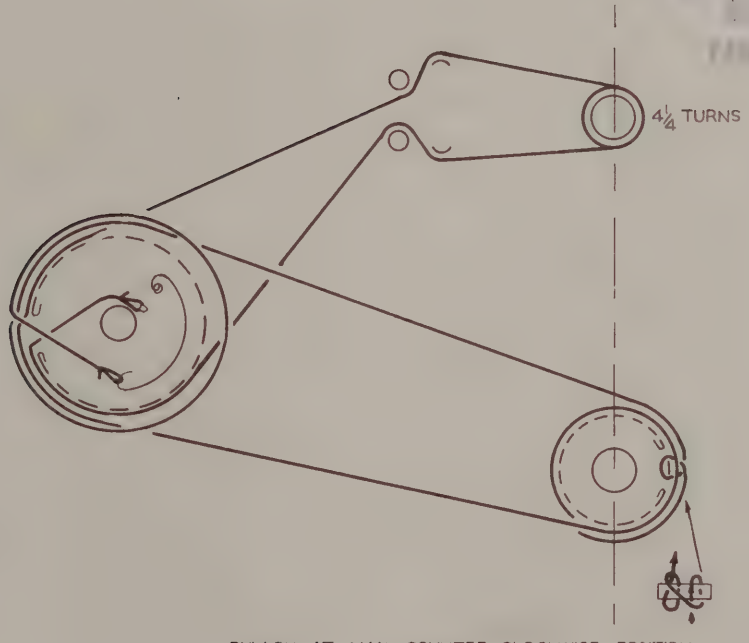
The fuse, M2, has been changed to a 2 amp. slo-blo.

R82 is omitted.

V6 is changed to a 3AU6. This tube is used only as a sound IF. The horizontal AFC portion of the original 5AN8 is replaced by a selenium dual diode. A partial schematic is given below showing the new arrangement.

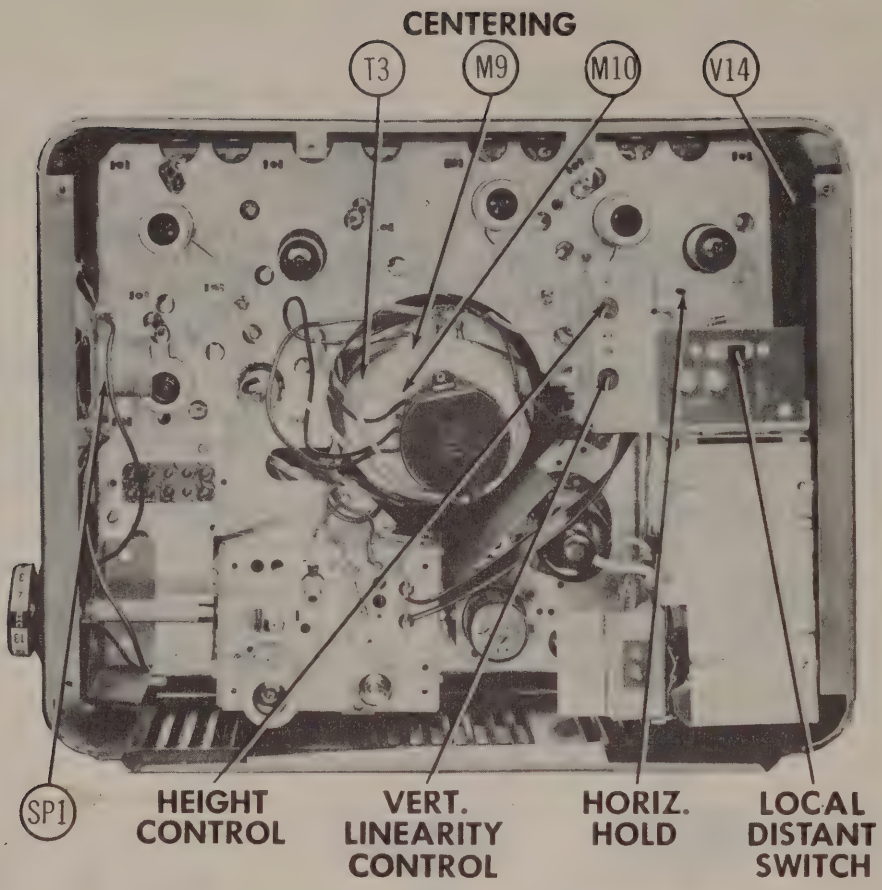
C39 is increased from 470MMF to 2200MMF.





PULLEY AT MAX. COUNTER CLOCKWISE POSITION

UHF DRIVE CORD STRINGING

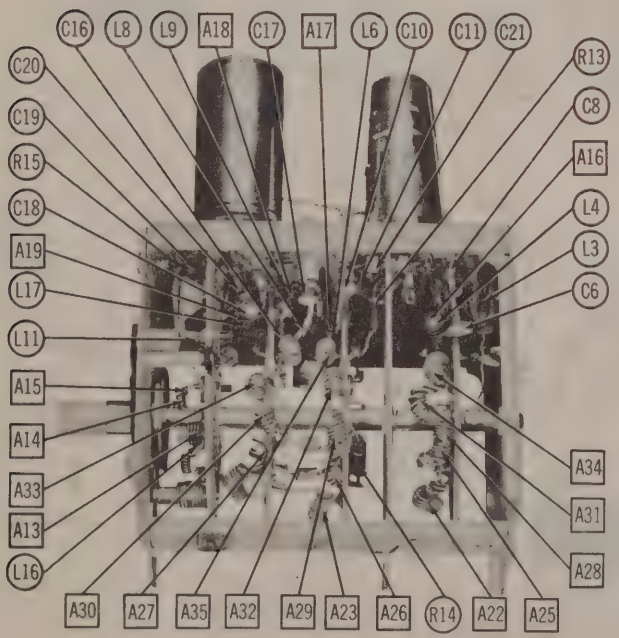


CABINET—REAR VIEW

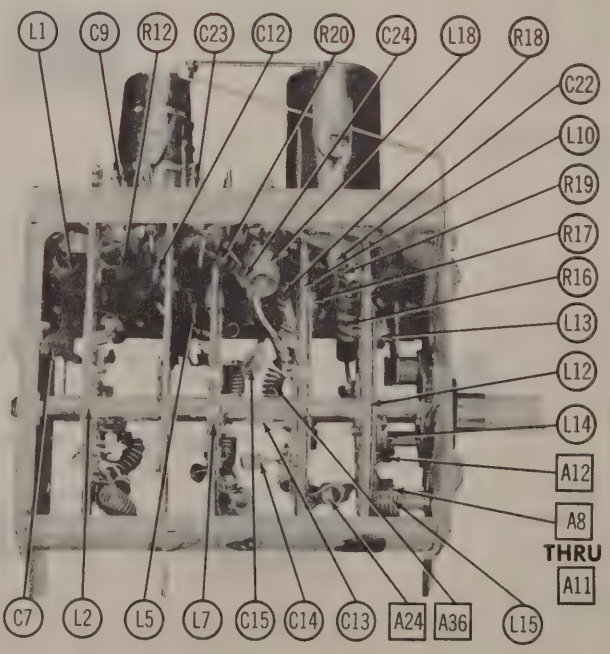
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Adjust the horizontal hold slug (L27) until the picture falls in sync.

Switch off channel and back again, then the picture should fall in sync. If necessary readjust L27 for this condition.



RF TUNER RIGHT SIDE



RF TUNER LEFT SIDE

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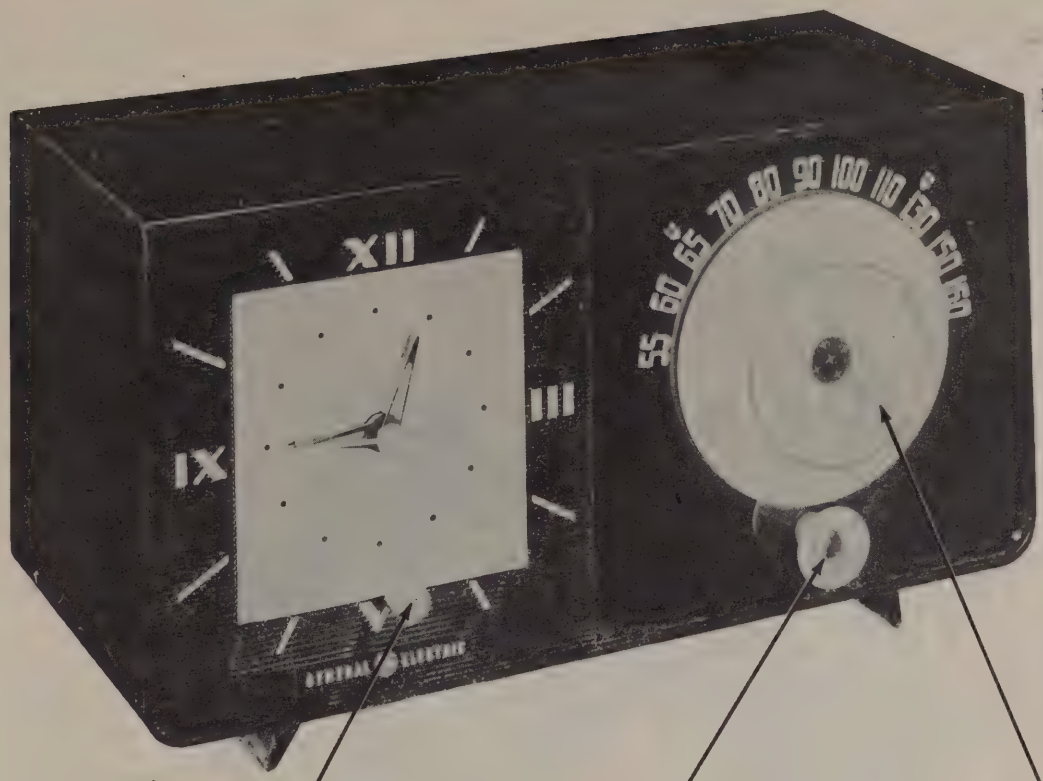
GENERAL ELECTRIC
MODELS 900, 902, 903



GENERAL ELECTRIC
MODELS 900, 902, 903

TRADE NAME	General Electric Models 900, 902, 903
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N. Y.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12AU6 Converter, 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12AU6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal	"	A6	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
Model 900

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		General Electric PART No.	STANDARD REPLACEMENT	
V1	Converter	12AU6	12AU6	
V2	IF Amp.	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	75	150	RCE-215			TCT3115		CADP-513	
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	10		RCW-3127	NPO-S110	TCZ-10	TZ09	NPOA-100	ZT-541	5TCC-Q1	
C3	33		RCW-3178	NPO-S133	TCZ-33	TZ18	NPOL-330	ZT-5433	5TCC-Q33	
C4	4		RCW-3204							
C5	.05	200	RCC-086	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C6	10000		RCW-3054	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C7A	400		RCW-3177							
B	220									
C	500									
C8	10000		RCW-3054	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C9	.047	600	RCN-053	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	RRC-323	AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R2	2.2Meg	½		BTS-2.2Meg	
R3	2.2Meg	½		BTS-2.2Meg	
R4	6.8Meg	½		BTS-6.8Meg	
R5	470KΩ	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R6	470KΩ	½		BTS-470K	
R7	1500Ω	2		BTB-1500	
R8	180Ω	½		BTS-180	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.7KΩ	3.4Ω	RTO-177				26S58		

SPEAKER

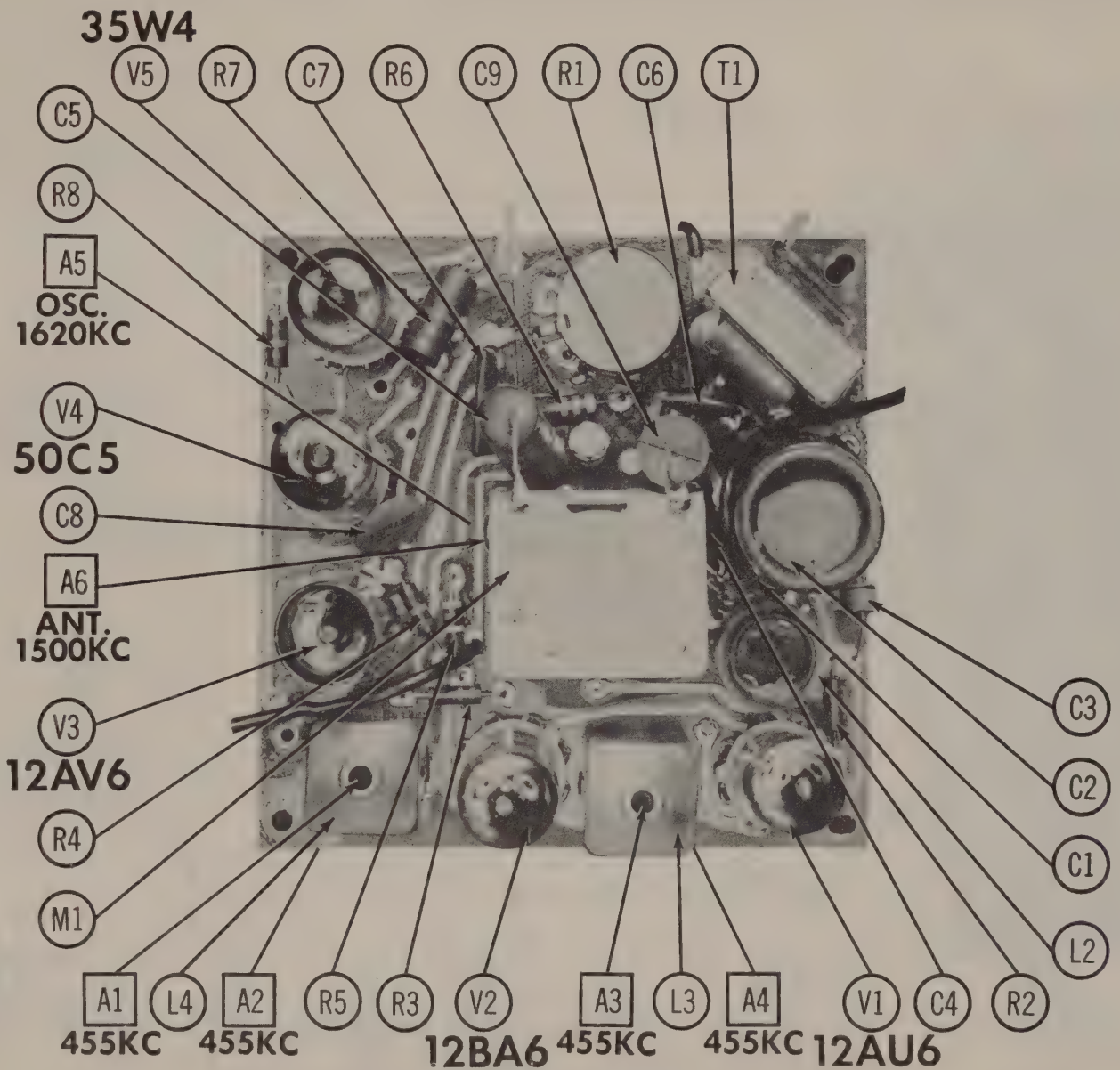
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	General Electric PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.4Ω	ROP-033	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.3Ω		RAB-269				Includes Cabinet . Back Tertiary Winding=1.9Ω
L2	Osc. Coil	1.5Ω	8Ω	RLC-133				
L3	Input IF	24Ω	24Ω	RTL-174	16-6780	BC-352	12-C1	
L4	Output IF	25Ω	25Ω	RTL-174	16-6780	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Tuning Cap.	RCT-083	2 Gang (17-375MMF, 14-120MMF)
M2	Clock Assy.	RZC-048	Less Crystal
	Cabinet	RAU-441	Model 900
	Cabinet	RAU-442	Model 902
	Cabinet	RAU-443	Model 903
	Knob	RDK-295	Volume-Model 900
	Knob	RDK-357	Volume-Model 902
	Knob	RDK-503	Volume-Model 903
	Knob	RDK-500	Tuning-Model 900
	Knob	RDK-501	Tuning-Model 902
	Knob	RDK-502	Tuning-Model 903
	Knob	RZK-021	Clock-Model 902
	Knob	RZK-025	Clock-Model 900
	Knob	RZK-031	Clock-Model 903
	Crystal	RZW-025	Clock

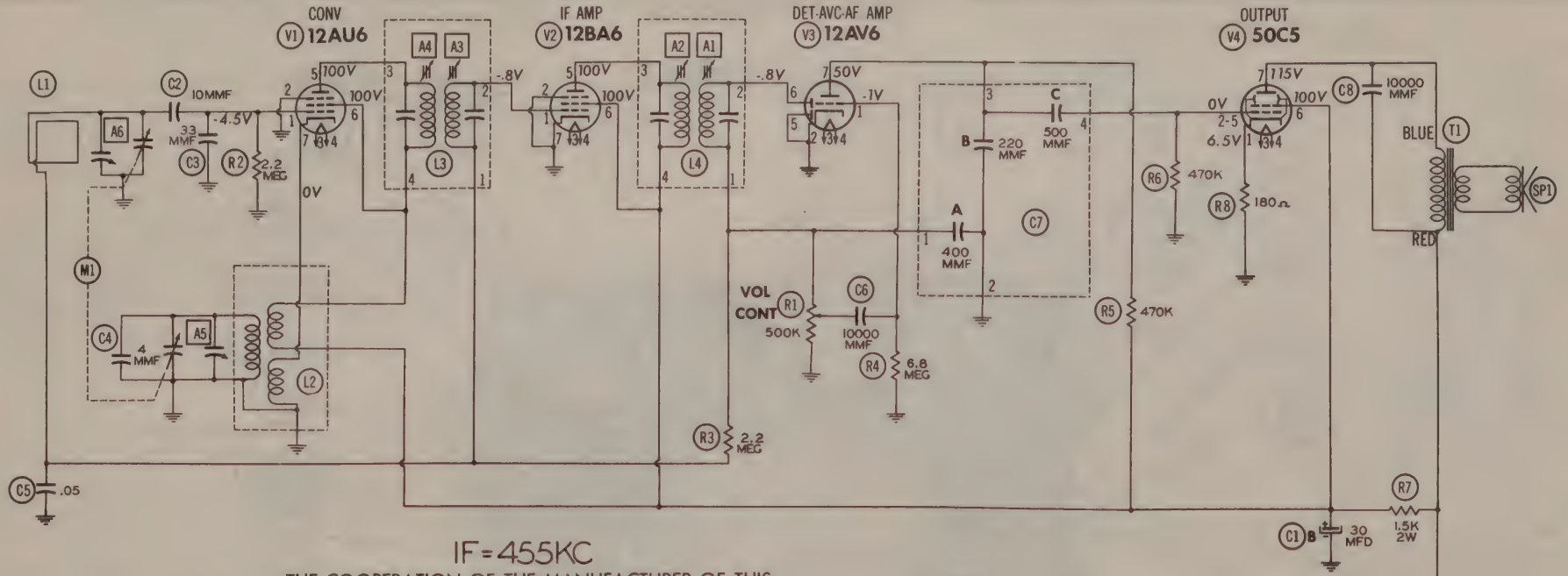


CHASSIS-TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
3911 MEADE ST.
DENVER, COLORADO

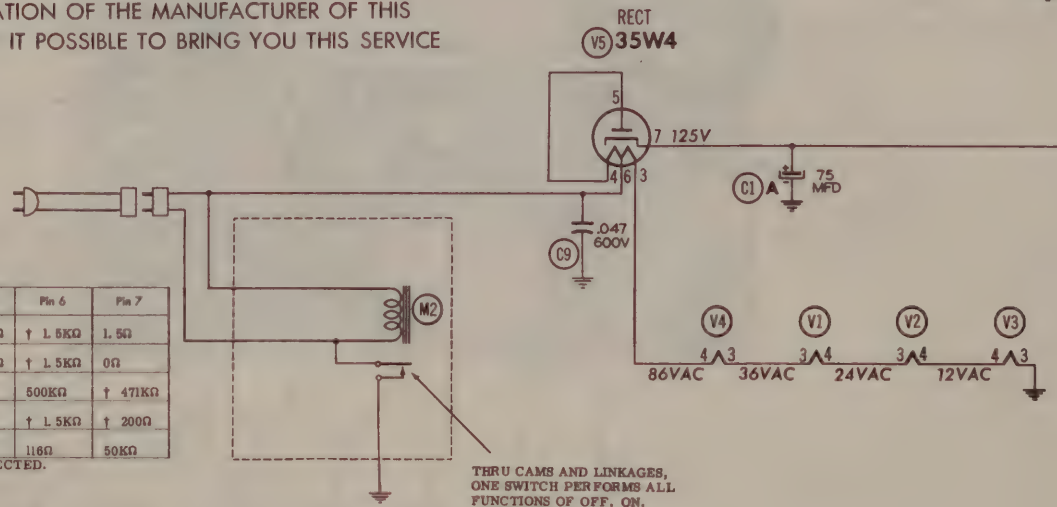
SET 310 FOLDER 5

GENERAL ELECTRIC
Model 900



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	0Ω	36Ω	24Ω	† 1.5KΩ	† 1.5KΩ	1.5Ω
V 2	12BA6	2.7Meg	0Ω	24Ω	12Ω	† 1.5KΩ	† 1.5KΩ	0Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	500KΩ	† 471KΩ
V 4	50C5	180Ω	470KΩ	36Ω	86Ω	470KΩ	† 1.5KΩ	† 200Ω
V 5	35W4	NC	NC	86Ω	121Ω	121Ω	116Ω	50KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

THRU CAMS AND LINKAGES, ONE SWITCH PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO. AND SLEEP.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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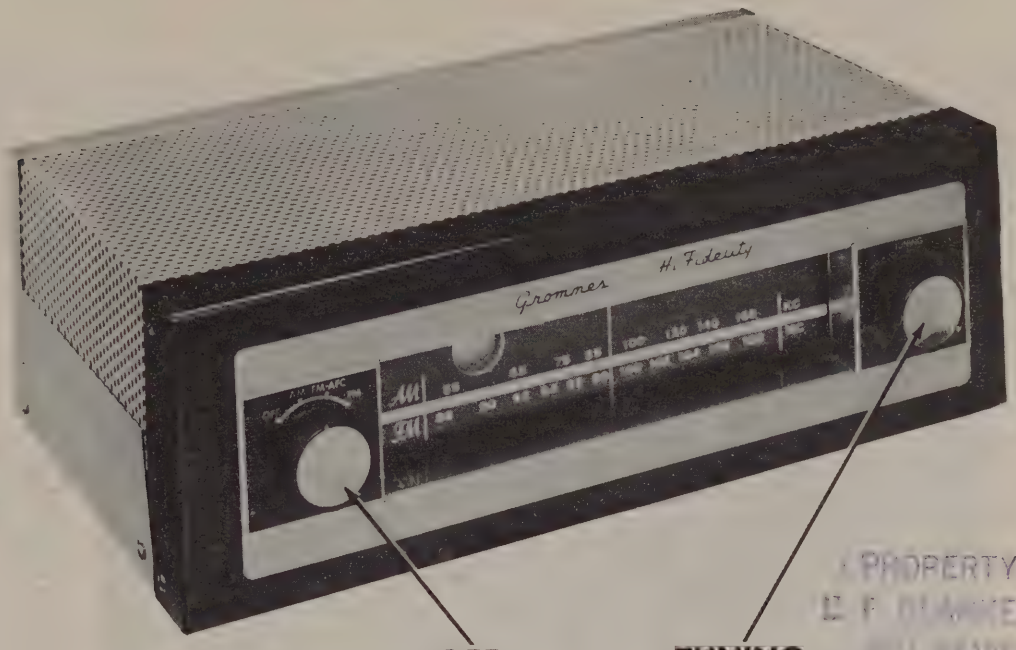
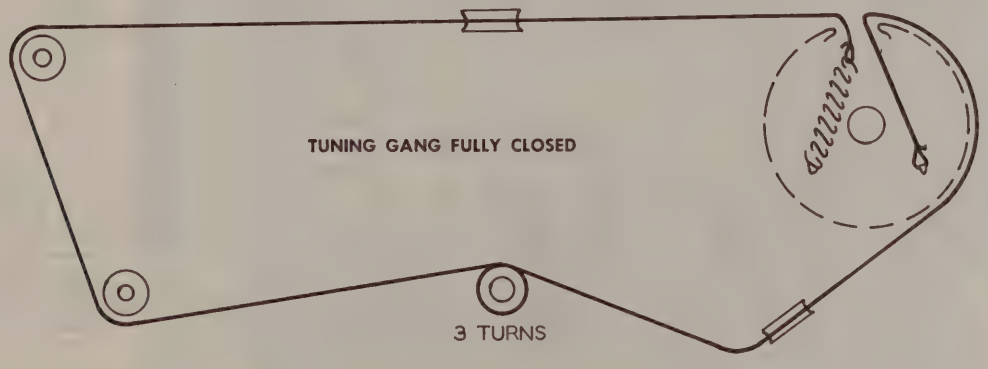
GROMMES
MODEL GRT-1



PROPERTY OF

TRADE NAME	Grommes Model GRT-1	
MANUFACTURER	Precision Electronics, 9101 King Ave., Franklin Park, Ill.	
TYPE SET	AC Operated AM-FM Superheterodyne Tuner	
TUBES	Twelve	
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING .45 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	530KC-1650KC	FREQ.MOD. 88MC-108MC



DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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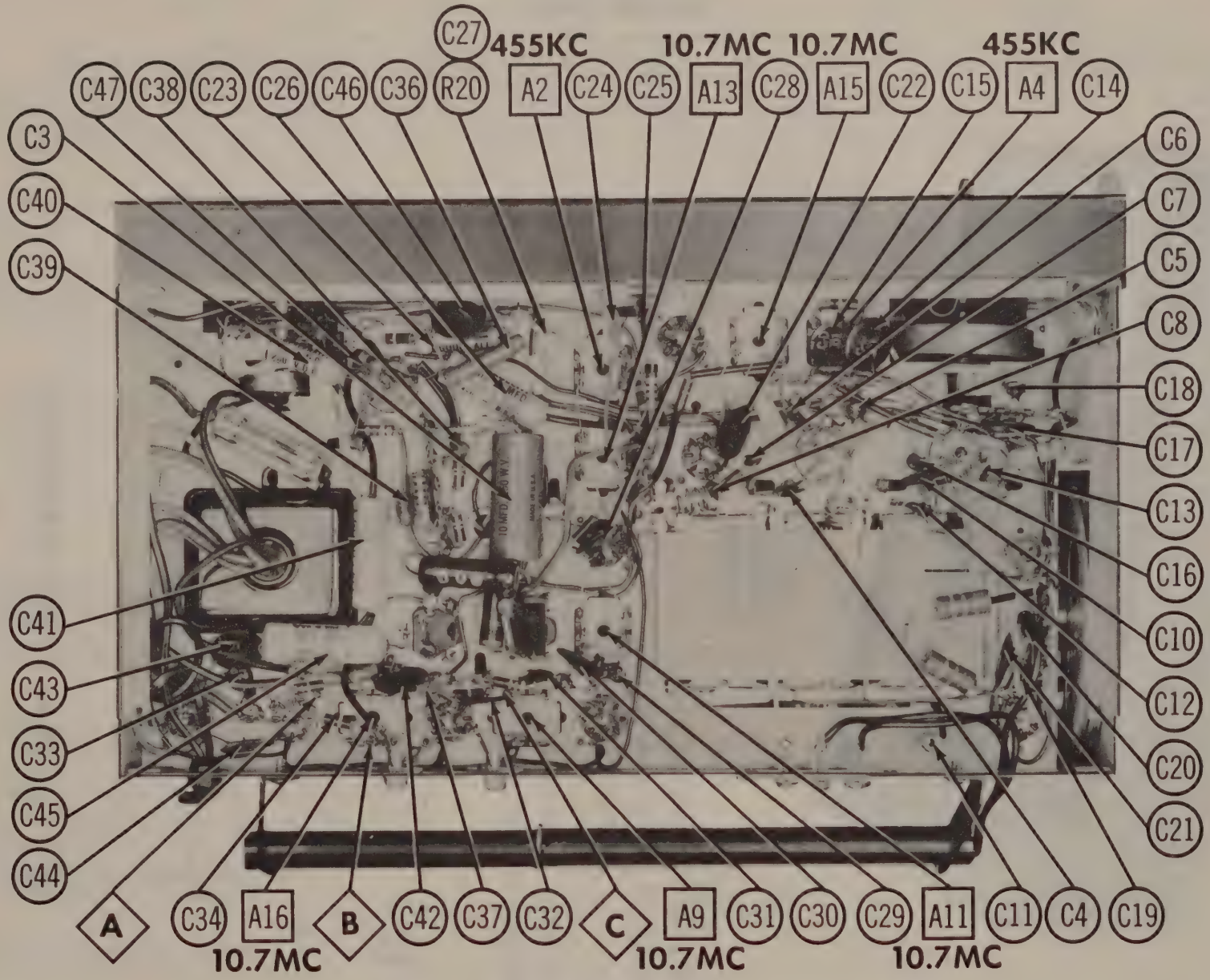
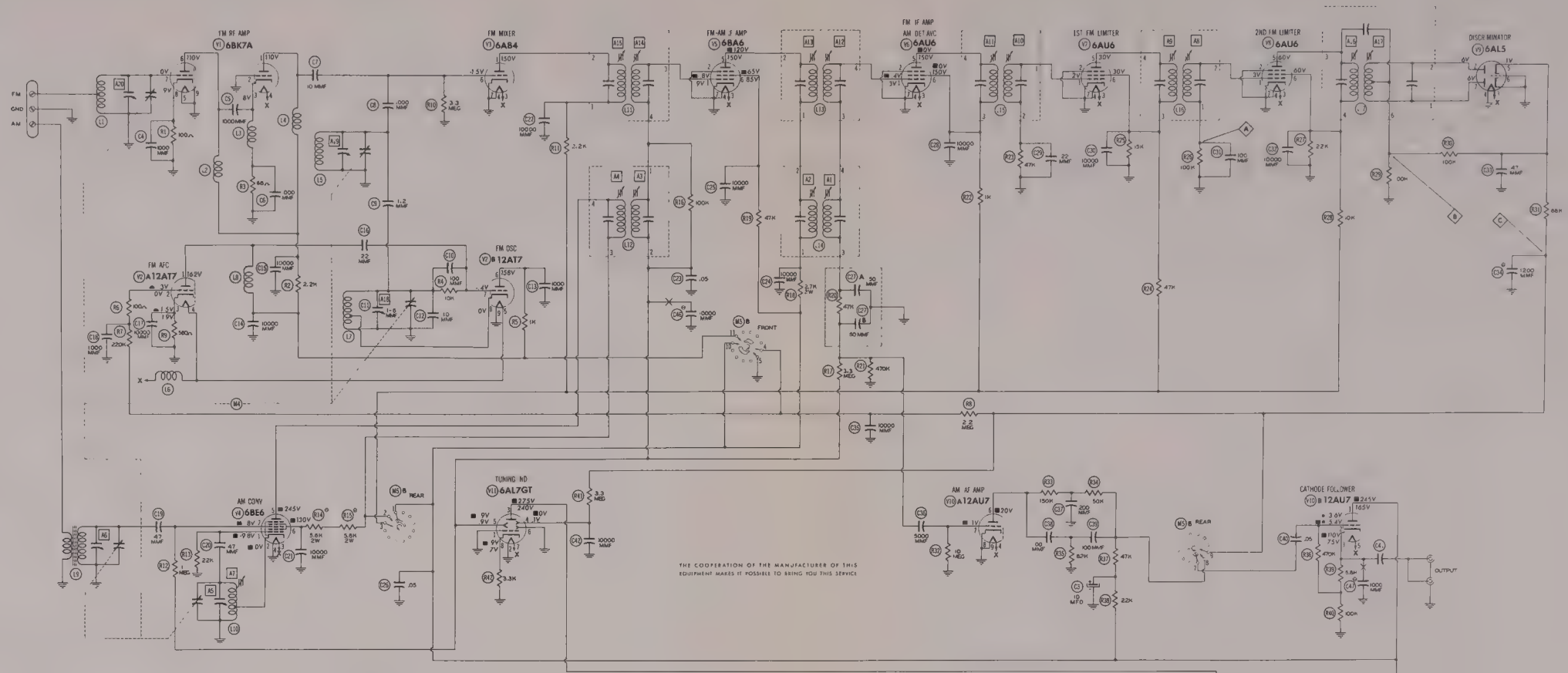


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	† 3.2KΩ	0Ω	68Ω	.1Ω	0Ω	† 3.2KΩ	0Ω	100Ω	TP
V 2	12AT7	† 1KΩ	▲ 2.6Meg 220KΩ	560Ω	.1Ω	.1Ω	† 2KΩ	10KΩ	0Ω	0Ω
V 3	6AB4	† 3.2KΩ	TP	.1Ω	0Ω	TP	3.3Meg	0Ω		
V 4	6BE6	22KΩ	.5Ω	.1Ω	0Ω	†■ 1KΩ	†■ 12.2KΩ	4.7Meg		
V 5	6BA6	3.8Meg	0Ω	.1Ω	0Ω	† 3.7KΩ	† 48KΩ	0Ω		
V 6	6AU6	517KΩ	0Ω	.1Ω	0Ω	† 2KΩ	† 2KΩ	0Ω		
V 7	6AU6	47KΩ	0Ω	.1Ω	0Ω	† 25KΩ	† 25KΩ	0Ω		
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 10KΩ	† 10KΩ	0Ω		
V 9	6AL5	0Ω	100KΩ	.1Ω	0Ω	200KΩ	TP	100KΩ		
V 10	12AU7	† 1KΩ	570KΩ	106KΩ	.1Ω	.1Ω	† 370KΩ	10Meg	0Ω	0Ω
V 11	6AL7	0Ω	0Ω	† 0Ω	3.5Meg	3.7Meg	0Ω	.1Ω	0Ω	
V 12	6X4	120Ω	NC	0Ω	.1Ω	NC	120Ω	20KΩ		

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS DESIGNATED OTHERWISE.
■ MEASURED IN AM POSITION.
▲ MEASURED IN FM-AFC POSITION.
● MEASURED FROM PIN 3 OF V10.
† MEASURED FROM PIN 7 OF V12.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

SELECTOR SWITCH SHOWN IN OFF POSITION
SWITCH SEQUENCE
1. OFF
2. AM
3. FM AFC
4. FM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 cycles per sec.
3. Socket connections are shown as bottom views.
4. Measured via wire jumper from socket pin to ground.
5. Line voltage maintained at 117 volts for voltage readings.
6. Measure clockwise on component value marking position a rotation of ± 15% to voltage and resistance readings.
8. Volume control at maximum, no signal input for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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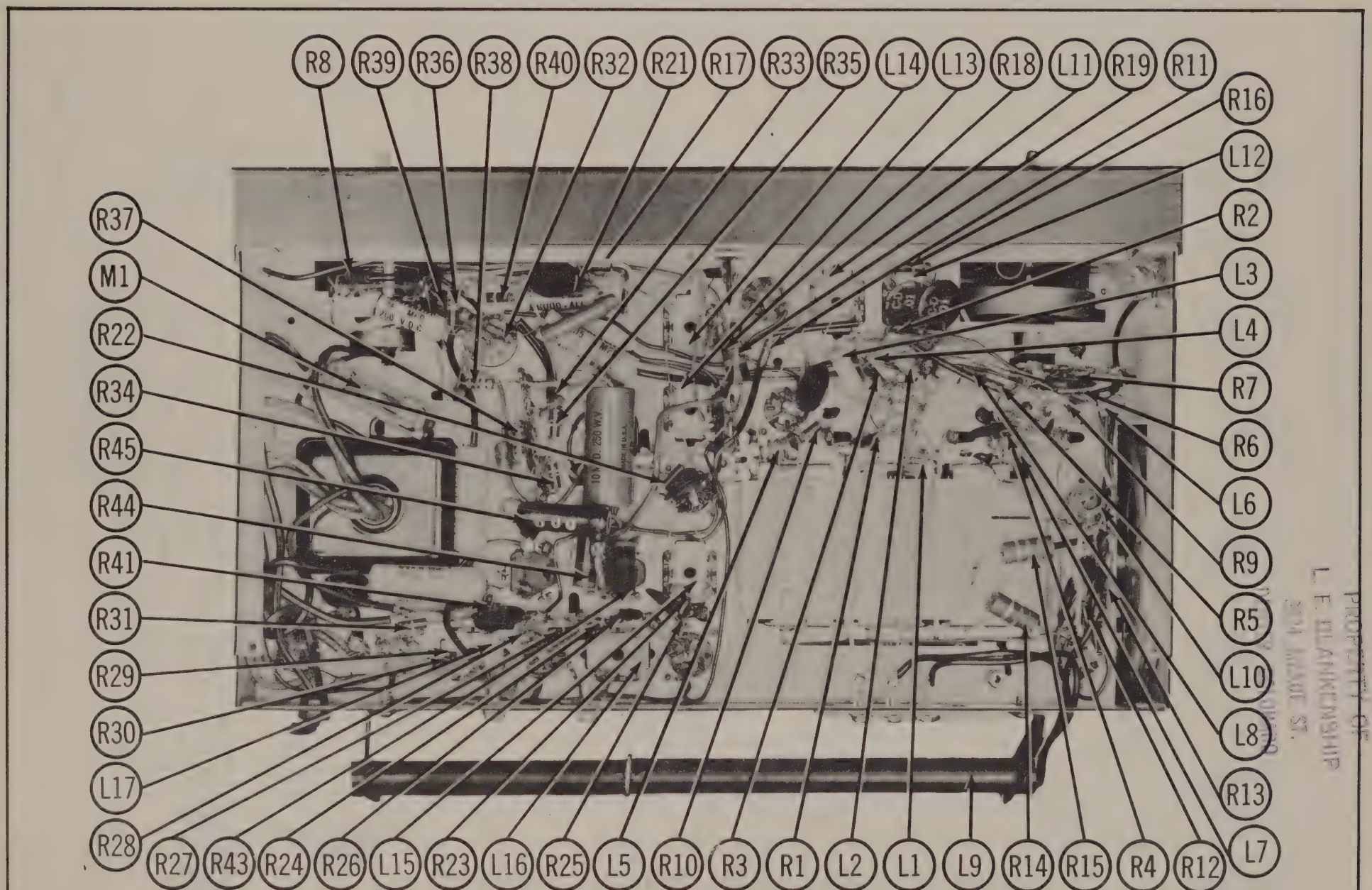


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

GROMMES
Model GRT-1

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
Set pointer to vertical line at low side of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V4). Low side to chassis.	455KC (400∿Mod)	AM	Point of non-interference	Across audio output (rear panel)	A1, A2, A3, A4	Adjust for maximum output.
2.	220MMF	High side thru 220MMF to AM antenna terminal. Low side to chassis.	1500KC	"	1500KC	"	A5, A6	"
3.	"	"	600KC	"	600KC	"	A7	Adjust for maximum output while rocking tuning gang.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 6 (grid) of 6AB4 (V3). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe thru 100KΩ to point (A). Common to chassis.	A8, A9, A10, A11, A12, A13, A14, A15	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe thru 100KΩ to point (B). Common to chassis.	A16	"
6.	"	"	"	"	"	DC probe thru 100KΩ to point (C). Common to chassis.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 6 (grid) of 6AB4 (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. thru 100KΩ to point (A). Low side to chassis.	A8, A9, A10, A11, A12, A13, A14, A15	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. thru 100KΩ to point (B). Low side to chassis.	A16	"
6.	"	"	"	"	"	Vert. Amp. thru 100KΩ to point (C). Low side to chassis.	A17	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A16 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	270Ω Carbon Resistor	High side thru 270Ω to FM Antenna terminal. Low side to chassis.	106MC (Unmod)	FM	106MC	DC probe thru 100KΩ to point (A). Common to chassis.	A18, A19, A20	Adjust for maximum deflection.
8.	"	"	90MC	"	90MC	"	L1, L5, L7	Adjust for maximum deflection by expanding or compressing coil turns of L1, L5 and L7.

FIG. 1

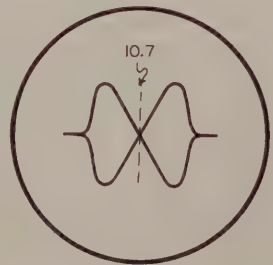


FIG. 2

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: GROMMES PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	FM RF Amp.	6BK7A	6BK7A	
V2	FM Osc. -FM AFC	12AT7	12AT7	
V3	FM Mixer	6AB4	6AB4	
V4	AM Converter	6BE6	6BE6	
V5	FM-AM IF Amp.	6BA6	6BA6	
V6	FM IF Amp. -AM Det. -AVC	6AU6	6AU6	
V7	1st FM Limiter	6AU6	6AU6	
V8	2nd FM Limiter	6AU6	6AU6	
V9	Discriminator	6AL5	6AL5	
V10	AM AF Amp. -Cathode Follower	12AU7	12AU7	
V11	Tuning Indicator	6AL7GT	6AL7GT	
V12	Rectifier	6X4	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	250	(Note 1)	AFH2-26	B020	FP217	TM-D20-250	D-110	TVA-2510
B	■20	250	(Note 1)						
C2A	■20	250		AFH2-26	B020	FP217	TM-D20-250	D-110	TVA-2510
B	▲20	250							
C3	10	250		PRS250V12	BR1225	TC52	TD-10-250	FM-2512	TVA-1504

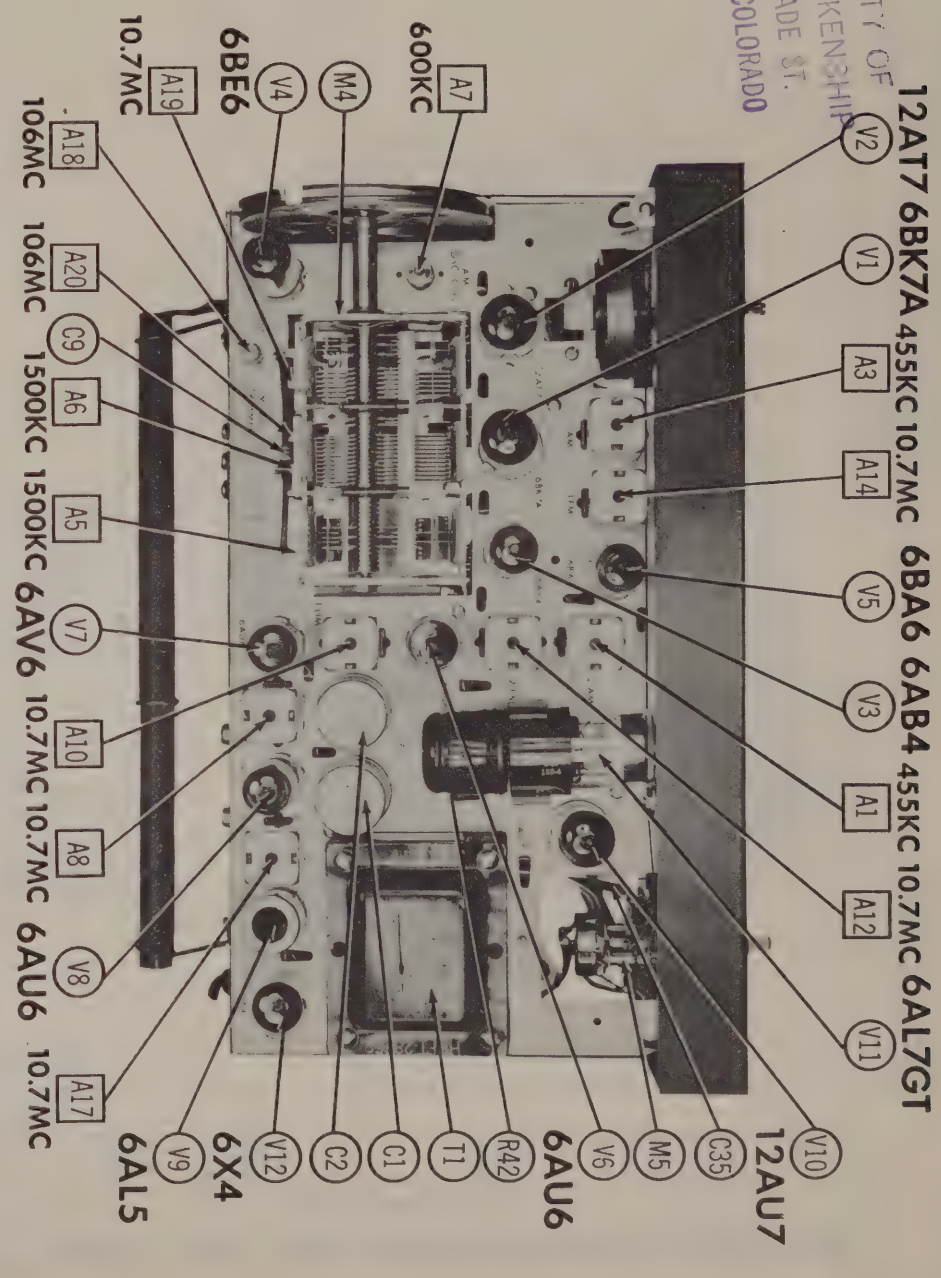
Note 1. When C1A is 40MFD, C1B is not used.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C5	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C6	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C7	10			N750-D110	TCN-10	N018	N750A-100	NT-541	5TCU-Q1	
C8	1000			BPD-001	DD-102	K069	811-001	DC-521	5HK-D1	
C9	1.2			NP0-S11.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C10	100			N750-D1100	TCN-100	N042	N750L-101	NT-531	5TCU-T1	
C11	1-6				829-6					
C12	10			N750-D110	TCN-10	N018	N750A-100	NT-541	5TCU-Q1	
C13	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C15	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C16	22			BPD-000022	D6-220	G024	831-220	UC-5422	5GA-Q22	
C17	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C18	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C19	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C20	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C21	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C22	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C23	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C24	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C25	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C26	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C27A	50		}	♦PA-99	♦PC-52	♦111TM3	♦1403-03	UC-545	♦D-3	
B	50		}					UC-545		
C28	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C29	22			SI22	D6-220	G024	831-220	UC-5422	5GA-Q22	
C30	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C31	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C32	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C33	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C34	1200			SI1200	D6-122	TP53	GP2L-122	UC-5212	5HK-D12	Note 2
C35	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C36	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C37	200	500		NP0-SI200	TCZ-200	5R5T2	NP0-334-201	MCB237	MS-32	
C38	100			SI100	D6-101	TP34	801-101	UC-531	5GA-T1	
C39	100			SI100	D6-101	TP34	801-101	UC-531	5GA-T1	
C40	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	

CHASSIS—TOP VIEW



PROPERTY OF
L. F. WAKENSHIA
3000 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C41	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C42	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C43	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C44	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 3
C45	.05	600		BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C46	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 3
C47	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	Note 3

♦ Items C27A, C27B and R20 are combined in one unit.
Note 2. Some versions may use 1000MMF unit in this application.
Note 3. Not used in some versions.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA GROMMES PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R1	100Ω	½		BTS-100	
R2	2200Ω	½		BTS-2200	
R3	68Ω	½		BTS-68	
R4	10KΩ	½		BTS-10K	
R5	1000Ω	½		BTS-1000	
R6	100Ω	½		BTS-100	
R7	220KΩ	½		BTS-220K	
R8	2.2Meg	½		BTS-2.2Meg	
R9	560Ω	½		BTS-560	
R10	3.3Meg	½		BTS-3.3Meg	
R11	2200Ω	½		BTS-2200	
R12	1Meg	½		BTS-1Meg	
R13	22KΩ	½		BTS-22K	
R14	5600Ω	2		BTB-5600	Note 1
R15	5600Ω	2		BTB-5600	Note 1
R16	100KΩ	½		BTS-100K	
R17	3.3Meg	½		BTS-3.3Meg	
R18	2700Ω	2		BTB-2700	
R19	47KΩ	½		BTS-47K	
R20	47KΩ		♦	BTS-47K	
R21	470KΩ	½		BTS-470K	
R22	1000Ω	½		BTS-1000	
R23	47KΩ	½		BTS-47K	
R24	47KΩ	½		BTS-47K	
R25	15KΩ	½		BTS-15K	
R26	100KΩ	½		BTS-100K	
R27	22KΩ	½		BTS-22K	
R28	10KΩ	½		BTS-10K	
R29	100KΩ	½		BTS-100K	
R30	100KΩ	½		BTS-100K	
R31	68KΩ	½		BTS-68K	
R32	10 Meg	½		BTS-10Meg	
R33	150KΩ	½		BTS-150K	
R34	150KΩ	½		BTS-150K	
R35	82KΩ	½		BTS-82K	
R36	470KΩ	½		BTS-470K	
R37	47KΩ	½		BTS-47K	
R38	22KΩ	½		BTS-22K	
R39	6800Ω	½		BTS-6800	
R40	100KΩ	½		BTS-100K	
R41	3.3Meg	½		BTS-3.3Meg	
R42	3300Ω	½		BTS-3300	
R43	1000Ω	2		BTB-1000	Note 2
R44	1000Ω	2		BTB-1000	Note 2
R45	500Ω	5		PW7-500	

Note 1. In some versions R14 & R15 are replaced with a single 11.2KΩ 4W resistor, (WW).
Note 2. In some versions R43 & R44 are replaced with a single 500Ω 5W resistor, (WW).
♦ Items R20, C27A, C27B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ③ .45A	444VCT .069ADC	6.3VAC ③ 3.95A							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA GROMMES PART No. FUSE	GROMMES PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1A * 250V			312001. (3AG 1A)	357001	AGC1	4405

* Some versions use a 1½A. fuse.

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Dial Light		#47
M3	Dial Light		#47
M4	Tuning Cap.	JV24600	AM Sections of tuning cap. (27-535MMF, 28-200MMF)
M5 A	Switch		On-off (Power)
B	Switch		Selector (Rotary-wafer type)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA GROMMES PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω						Tapped
L2	RF Coil	.8Ω			19-1000		4602	1 Microhenry, IRC Part No. CLA
L3	Cathode Choke	.1Ω						.25 Microhenries, IRC Part No. CLA
L4	RF Coil	3Ω			19-1003		4608	3.3 Microhenries; IRC Part No. CLA
L5	FM RF Coil	0Ω						
L6	Fil. Choke	.8Ω			19-1000		4602	1 Microhenry; IRC Part No. CLA
L7	FM Osc. Coil	0Ω						Tapped
L8	RF Coil	.8Ω			19-1000		4602	1 Microhenry; IRC Part No. CLA
L9	AM Ant. Coil	.1Ω	.4Ω					
L10	AM Osc. Coil	4.3Ω			14-1060 *	BC-387 *	71-Osc. ■	Tapped ③ .5Ω
L11	1st FM IF	.7Ω	.7Ω	GT-24605	16-3487	FM-254	1463	
L12	1st AM IF	16Ω	16Ω	GT-24610	16-6758	BC-352	12-C1	
L13	2nd FM IF	.7Ω	.7Ω	GT-24605	16-3487	FM-254	1463	
L14	2nd AM IF	16Ω	16Ω	GT-24610	16-6758	BC-353	12-C2	
L15	3rd FM IF	.7Ω	.7Ω	GT-24605	16-3487	FM-254	1463	
L16	FM Limiter	.7Ω	.7Ω	GT-24605	16-3487	FM-254	1463	
L17	Discriminator	.8Ω	1ΩCT	GT-24608	17-3494	FM-253	1464	

* Use secondary winding.
■ Use primary winding.

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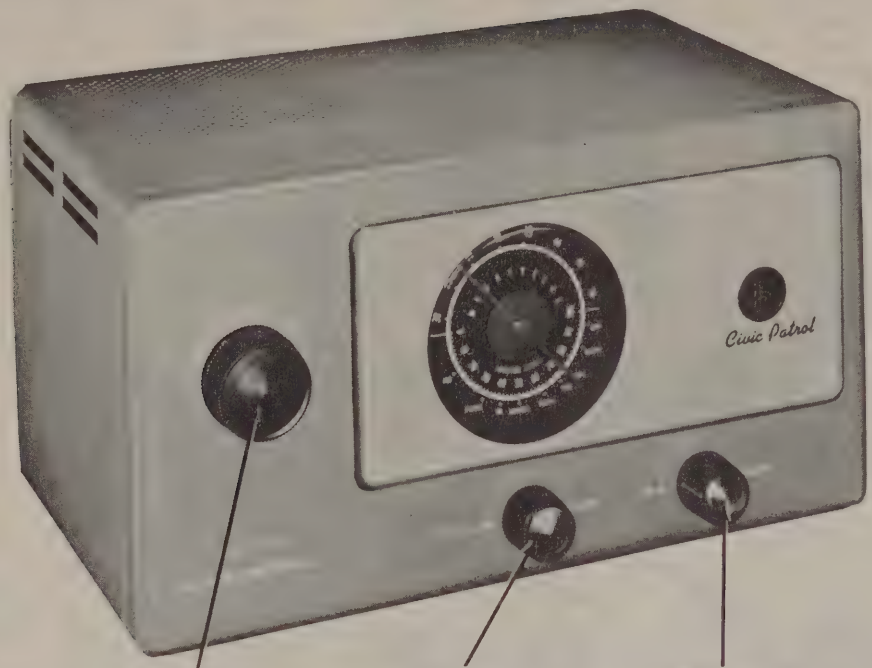
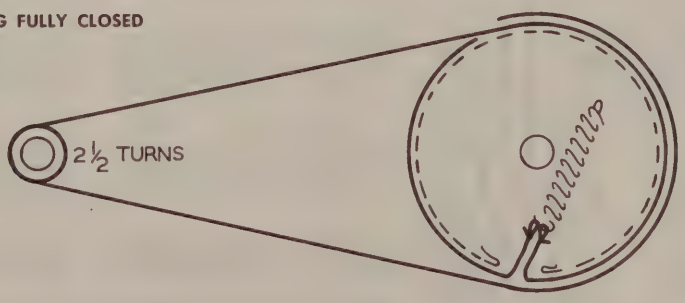


HALLICRAFTERS
MODEL S-94

TRADE NAME	Hallicrafters Model S-94 (Ch. Mark 1A)
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois
TYPE SET	AC-DC Operated FM Superheterodyne Receiver
TUBES (Eight)	Types 6BH6 RF Amp., 12AT7 Mixer-Osc., 12BA6 1st. IF Amp., 12BA6 2nd. IF Amp., 12AL5 Ratio Det., 6BH6 AF Amp., 50L6 Output, 12AU7 Squelch
POWER SUPPLY	105-125 Volts AC-DC RATING .35 Amp. @ 117 Volts AC
TUNING RANGE-	FREQ. MOD. 30MC-50MC

TUNING GANG FULLY CLOSED



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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		Hallicrafters PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	6BH6	6BH6	
V2	Mixer-Osc.	12AT7	12AT7	
V3	1st. IF Amp.	12BA6	12BA6	
V4	2nd. IF Amp.	12BA6	12BA6	
V5	Ratio Det.	12AL5	12AL5	
V6	AF Amp.	6BH6	6BH6	
V7	Output	50L6GT	50L6GT	
V8	Squelch	12AU7	12AU7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Hallicrafters PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150	45B091		BBRQ55515C	WQ250	CDB-442	FMT-333	R2199
B	40	150					TD-80-150	FM-1540	TVA-1413
C	40	150							
D	20	25							
C2	10	150	45C097		BR1015	TC42	TD-10-150	FM-1512	TVA-1406
C3	2	50	45B192		BBR2-50	TC302	TD-2-50	MMT-0505	TVA-1301

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

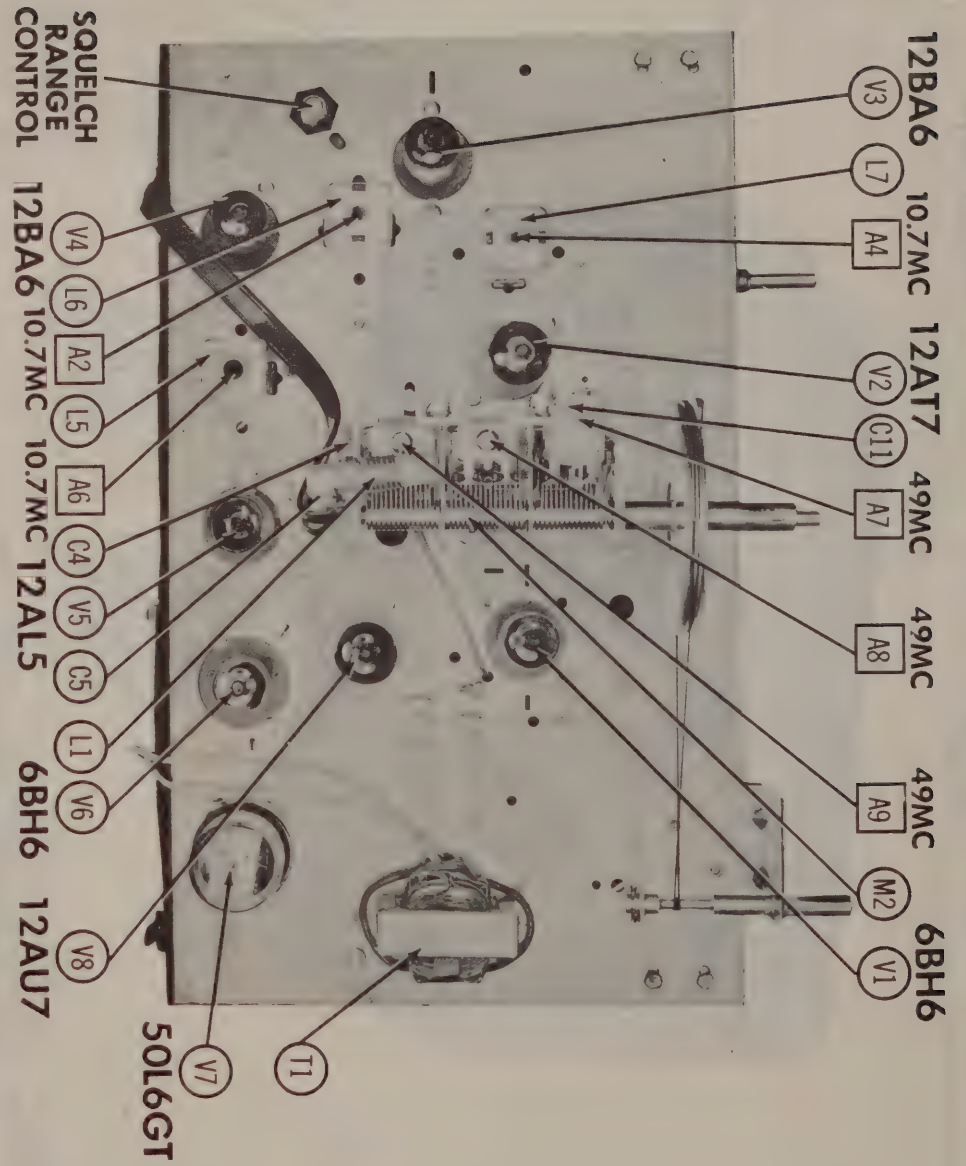
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	330		47CA2533lK/D							
C5	330		47CA2533lK/D							
C6	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C7	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C8	50			N750-S150	TCN-50	TN15	N750K-500	NT-5447	5GA-Q5	
C9	4.7		47A160-6	NP0-S14.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCCB-V47	
C10	100		47X25UK101K	N750-S1100	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	
C11	7-35		44A125		822-BN		TS2A-7	DT-557-N		
C12	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C13	33		47X25CJ330J	NP0-S133	TCZ-33	TZ18	NP0L-330	ZT-5433	5TCC-Q33	
C14	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C15	10000		47A224	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C16	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C17	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C18	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C19	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C20	100		47X25UK101K	N750-S1100	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	Note 1
C21	100		47X25UK101K	N750-S1100	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	Note 1
C22	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	10000		47A224	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C24	330		47CA2533lK/D							
C25	330		47CA2533lK/D							
C26	10000		47A224	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C27	10000		47A224	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C28	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C29	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C32	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C34	.1	600	46BR473L6	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

Note 1. When C20 is 220MMF, C21 is not used.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	25B1115	AB-76	A47-2Meg-Z	Q13-139	U-55	Volume
B	Shaft		Not Req.	AK-9	RS-2	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A
R2A	50KΩ	½	25B1114	AB-34		Q14-123	U-34	Squelch
B	Shaft		Not Req.	AK-9		Not Req.	Not Req.	Attach to R2A
C	Switch		Not Req.	KB-1		76-1	US-26	Attach to R2A
R3A	650Ω	1	25A1113	V-128	A43-750	W-750	R750L	Squelch Range (wire wound)
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R3A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	10KΩ	½	23X20X103K	BTS-10K	
R5	10KΩ	½	23X20X103K	BTS-10K	
R6	100Ω	½	23X20X101K	BTS-100	
R7	10KΩ	½	23X20X103K	BTS-10K	
R8	1000Ω	½	23X20X102K	BTS-1000	
R9	1000Ω	½	23X20X102K	BTS-1000	
R10	1000Ω	½	23X20X102K	BTS-1000	
R11	1000Ω	½	23X20X102K	BTS-1000	
R12	100Ω	½	23X20X101K	BTS-100	
R13	1000Ω	½	23X20X102K	BTS-1000	
R14	100Ω	½	23X20X101K	BTS-100	
R15	47KΩ	½	23X20X473K	BTS-47K	
R16	2.2Meg	½	23X20X225K	BTS-2.2Meg	
R17	270KΩ	½	23X20X274K	BTS-270K	
R18	1Meg	½	23X20X105K	BTS-1Meg	
R19	470KΩ	½	23X20X474K	BTS-470K	
R20	100Ω	½	23X20X101K	BTS-100	
R21	270KΩ	½	23X20X274K	BTS-270K	
R22	1200Ω	½	23X20X122K	BTS-1200	
R23	10KΩ	2	23X40X103K	BTS-10K	
R24	470Ω	½	23X20X471K	BTS-470	
R25	15Ω	1	23X30X150K		
R26	220Ω	2	23X40X221K		
R27	470Ω	1	23X30X471K	BTA-470	
R28	270Ω	1	24BW271K	BW1-270	
R29	100Ω	½	23X20X101K	BTS-100	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Hallicrafters PART No	Halldorson PART No	Merit PART No.	Stancor PART No	Thordorson PART No.	Triad PART No.	NOTES
T1	2.4KΩ	1.96Ω RES. Tap ⑤ 3.2Ω	55B127 55A127 ①	21001	A-2902 ②	A-3825 ②	22563 ②		① Alternate audio output transformer. ② Drill new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Hallicrafters PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5"	PM	3.2Ω	85C120	5A1	22881	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L2	FM Ant. Coil	0Ω		51A1930				Tapped
L3	FM RF Coil	0Ω		51A1929				
L3	FM Osc. Coil	0Ω		51A1928				Tapped
L4	Fil. Choke	6.1Ω		53A333	19-1005		4612	8.5 Microhearies, IRC part #CL-1
L5	1st. FM IF	1Ω	1Ω	50CS19	16-3487	FM-254	1463	
L6	2nd. FM IF	1Ω	1Ω	50CS17	16-3487	FM-254	1463	
L7	Ratio Det.	3.8Ω	.3Ω	50CS18	17-3492	FM-356	1465	Tertiary winding-.7Ω

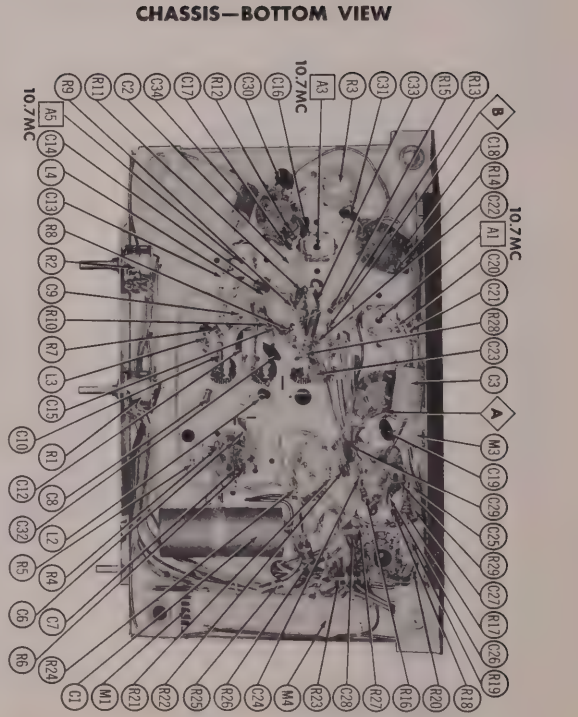
SELENIUM RECTIFIER

ITEM No	RATING CURRENT	REPLACEMENT DATA Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.114ADC	27A158	1005A	RS150	6S150	5P1	150	

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M2	Tuning Gap.	49D346	3 Gang
M3	Switch	60A343	Speaker-phones (SPDT-Slide type)
M4	Relay	21B193	Squelch control
	Cabinet	40C174	
	Knob	15B802	Tuning
	Knob	15B816	On-off-volume & squelch
	Dial	83C310	
	Dial Pointer	82A277	
	Dial Window	22B345	

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Squelch control to "off".
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 470KΩ (±1%) resistors in series from point Ⓐ to chassis. Junction of these resistors is alignment point Ⓐ as shown on schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod)	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (450KC Swp)	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4, A5	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to point Ⓒ.	A6	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A5 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	270Ω Carbon Resistor	High side thru 270Ω to terminal "A" antenna. Low side to terminal "G".	49MC	49MC	DC probe to point Ⓐ. Common to chassis.	A7, A8, A9	Adjust in order given for maximum deflection. Rock tuning gang while adjusting A9.
4.	"	"	33MC	33MC	"		Check for calibration and tracking. Not necessary unless osc. coil has been replaced.

SQUELCH RANGE CONTROL ADJUSTMENT

The squelch range control has been preset, but after replacement of squelch tube, relay or components it should be reset.
Set volume control to maximum.
Squelch range control fully clockwise.
Squelch control (on front of set) fully counter clockwise (but not "off").
Tune to noisy part of band where there is no signal.
Slowly rotate squelch range control (counter clockwise) until noise is just squelched.
Rotate control 65° (counter clockwise) beyond point of squelch.

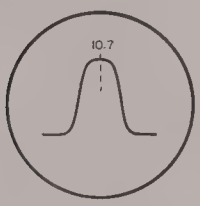


FIG. 1

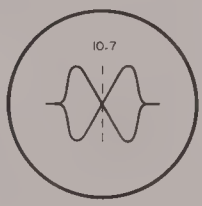
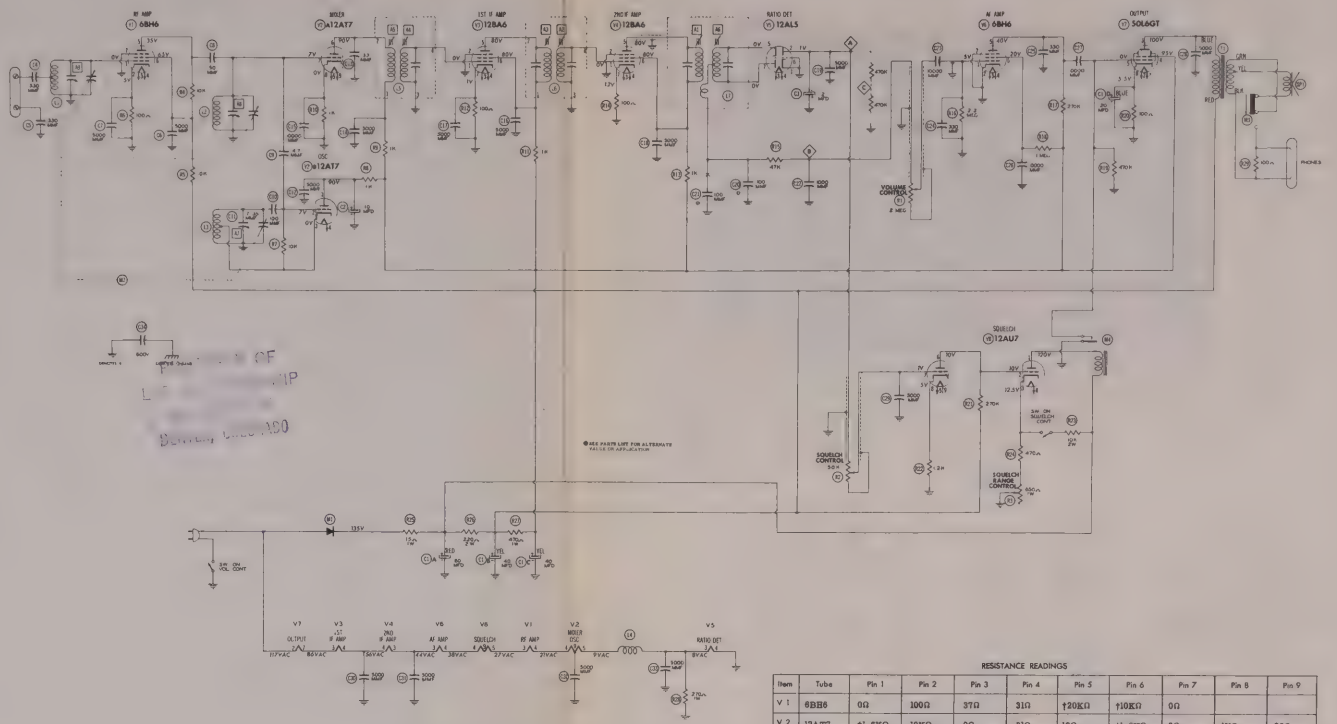


FIG. 2



FMIF = 10.7 MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BH6	0Ω	100Ω	37Ω	31Ω	†20KΩ	†10KΩ	0Ω		
V 2	12AT7	†1.6KΩ	10KΩ	0Ω	31Ω	19Ω	†1.6KΩ	0Ω	1KΩ	25Ω
V 3	12BA6	1Ω	0Ω	79Ω	67Ω	†1.6KΩ	†1.6KΩ	100Ω		
V 4	12BA6	1Ω	0Ω	55Ω	67Ω	†1.6KΩ	†1.6KΩ	100Ω		
V 5	12AL5	0Ω	50KΩ	13Ω	0Ω	2Meg	0Ω	2Meg		
V 6	6BH6	2.2Meg	0Ω	55Ω	49Ω	†270KΩ	†1Meg	0Ω		
V 7	50L6GT	TP	129Ω	†400Ω †700Ω	†700Ω	0Ω	TP	78Ω 50KΩ	100Ω	
V 8	12AU7	††1KΩ	†270KΩ	††1.1KΩ	49Ω	37Ω	†270KΩ	††0Ω	1.2KΩ	43Ω

ALL MEASUREMENTS TAKEN WITH SQUELCH RANGE CONTROL AT MAXIMUM CLOCKWISE POSITION AND SQUELCH CONTROL SET AT MAXIMUM COUNTER CLOCKWISE POSITION UNLESS DESIGNATED OTHERWISE.
† MEASURED FROM OUTPUT OF M1.
ϕ SQUELCH RANGE CONTROL AT MAXIMUM COUNTER CLOCKWISE POSITION.
†† SQUELCH CONTROL AT MAXIMUM CLOCKWISE POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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*TRADE MARK

RETMA MEMBER

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

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HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

HALLICRAFTERS MODEL 21T440M

TRADE NAME	Hallicrafters	MODELS	CHASSIS
		21T440B, 21T440M	A1900D
		21T441B, 21T441M	B1900D
		24T450B, 24T450M	C1900D
		24T451B, 24T451M	D1900D
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.25 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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PHOTOFACT* Folder
*TRADE MARK

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

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[illegible] MYARS ST.
[illegible] 10

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL - TABLE MODEL

1. Remove 6 push-on type control knobs from side panel of cabinet.

2. Remove 6 wood screws. Remove rear cover.

3. Remove 1 wood screw. Remove antenna terminal bracket.

4. Disconnect speaker leads.

5. Remove 2 wood screws on the inside rear corners that hold the chassis mounting board to the wood supports on the bottom of each side.

6. Remove 8 wood screws underneath along the sides of the chassis mounting board.

7. Remove 2 wood screws from top chassis brace.

8. Lift cabinet straight up and off.

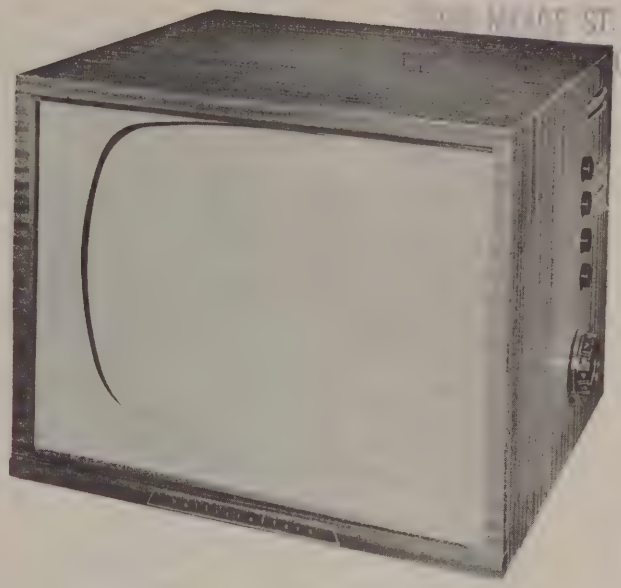
9. Remove 2 wing nuts. Remove speaker.

CHASSIS REMOVAL - CONSOLE MODELS

1. Perform steps 1 thru 4 as above.

2. Remove 4 bolts that hold the chassis board to cabinet shelf.

3. Remove chassis with mounting board.



MODELS	CHASSIS
21T440B, 21T440M	A1900D
21T441B, 21T441M	B1900D
24T450B, 24T450M	C1900D
24T451B, 24T451M	D1900D

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 5 wood screws holding plastic strip at the top edge of the safety glass. Remove plastic strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. adjustment is located on top of chassis.
Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set. Adjust the buzz control (R8) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

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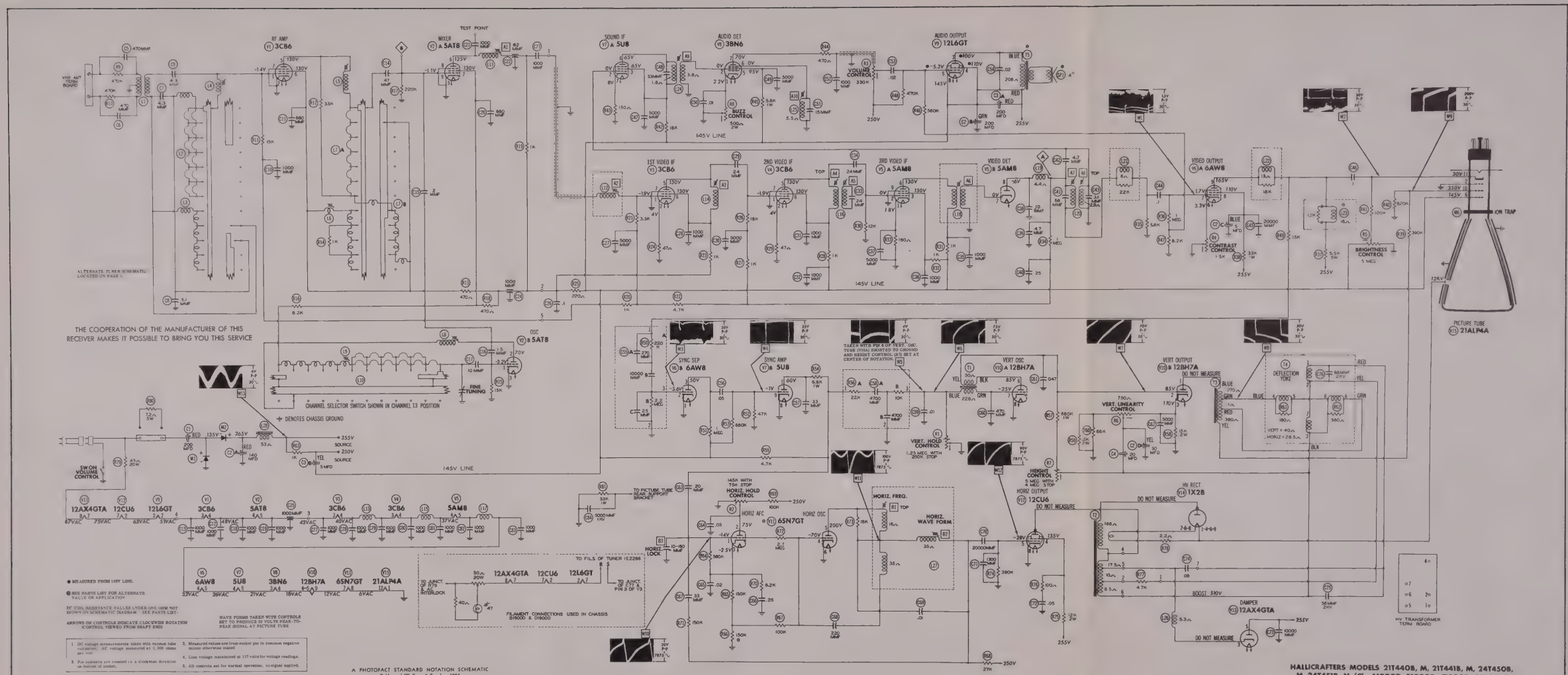
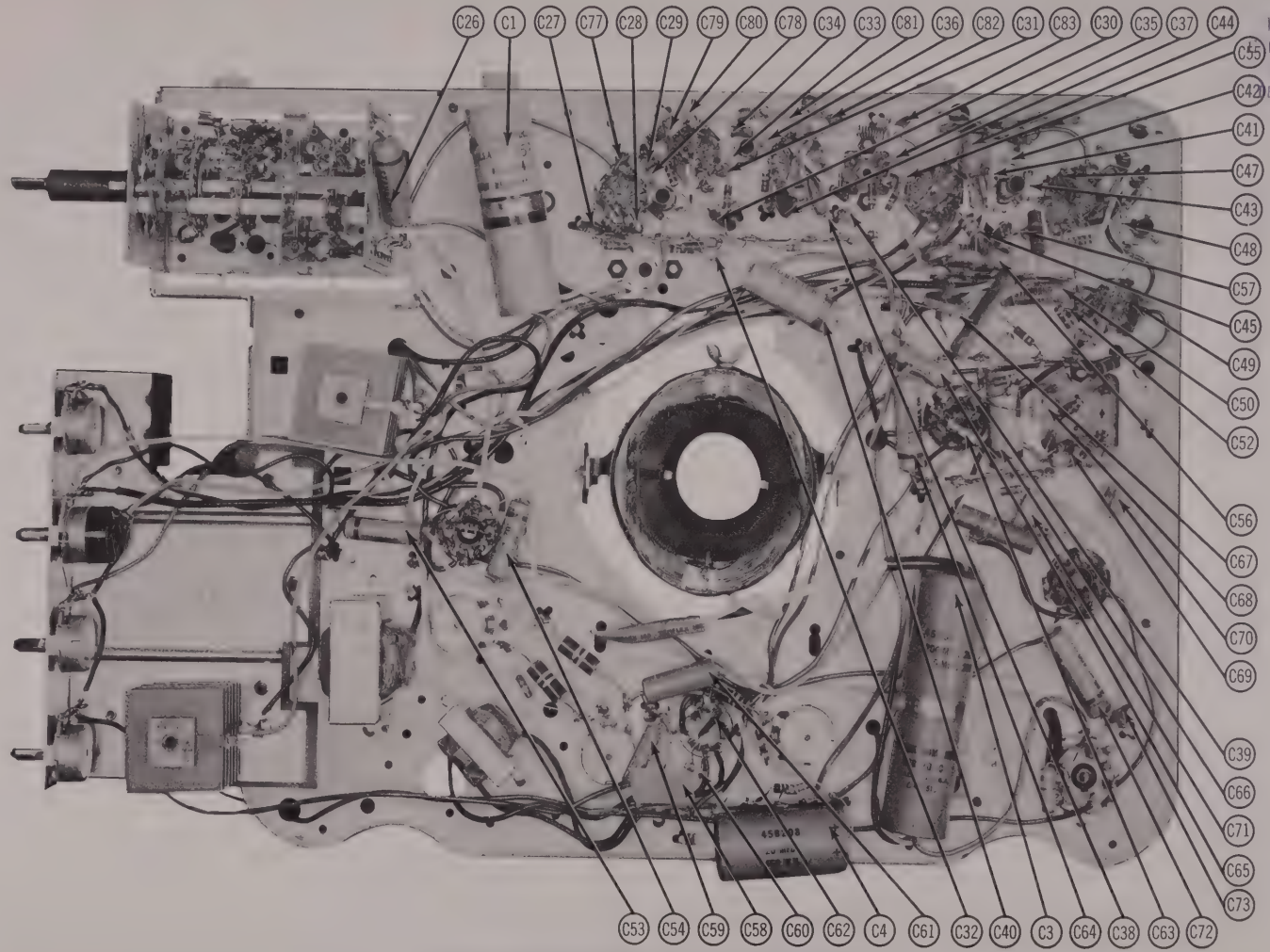
G233

DATE 3-56 SET 310 FOLDER 8

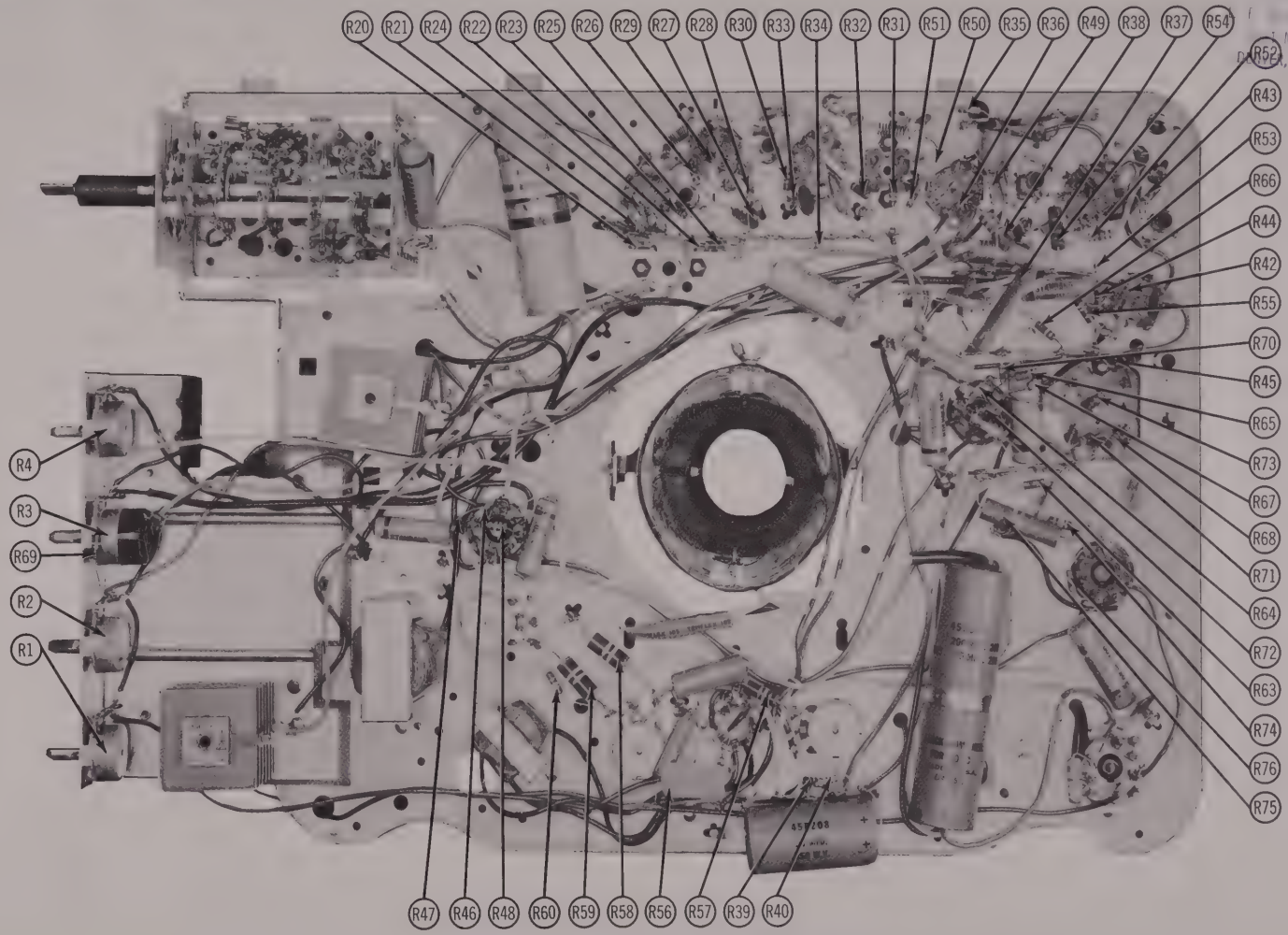

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP V1 3CB6
MIXER V2 A 5AT8
OSC V3 B 5AT8
SOUND IF V7 A 5U8
AUDIO DET V8 3BN6
AUDIO OUTPUT V9 12L6GT
1ST VIDEO IF V2 3CB6
2ND VIDEO IF V4 3CB6
3RD VIDEO IF V5 A 5AM8
VIDEO DET V5 B 5AM8
VIDEO OUTPUT V6 A 6AW8
SYNC SEP V6 B 6AW8
SYNC AMP V7 B 5U8
VERT OSC V10 A 12BH7A
VERT OUTPUT V10 B 12BH7A
HORIZ. HOLD CONTROL
HORIZ AFC
HORIZ OSC V11 65N7GT
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ OUTPUT V12 12CU6
HV RECT V14 1X2B
DAMPER V13 12AX4GTA
VERT. LINEARITY CONTROL
VERT. HOLD CONTROL
HEIGHT CONTROL
BRIGHTNESS CONTROL
CONTRAST CONTROL
VOLUME CONTROL
BUZZ CONTROL
FINE TUNING
ON/OFF VOLUME CONTROL
ION TRAP
PICTURE TUBE V15 21ALP4A
DEFLECTION YOKE
HV TRANSFORMER TERM. BOARD
145V LINE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 1.
TEST POINT
TO PICTURE TUBE BEAM SUPPORT BRACKET
TO FILS. OF TUNER (12296)
TO JUNCT. OF R79 AND INTERLOCK
TO JUNCT. OF C73 & PIN 3 OF V3
FILAMENT CONNECTIONS USED IN CHASSIS B1900D & D1900D
12AX4GTA 8A7 | 12CU6 7A7 | 12L6GT 2A7
V13 12AX4GTA 8A7 | V12 12CU6 7A7 | V5 12L6GT 2A7 | V1 3CB6 3A4 | V2 5AT8 5A5 | V3 3CB6 3A4 | V4 3CB6 3A4 | V5 5AM8 5A5 | V6 6AW8 3A5 | V7 5U8 3A5 | V8 3BN6 3A4 | V10 12BH7A 2-6J2 | V11 65N7GT 7A8 | V15 21ALP4A 12A1
87VAC 75VAC 63VAC 51VAC 48VAC 43VAC 40VAC 37VAC 32VAC 26VAC 21VAC 18VAC 12VAC 6VAC
● MEASURED FROM 145V LINE.
◎ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM - SEE PARTS LIST.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pot numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956
HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
MEADE ST.
COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART

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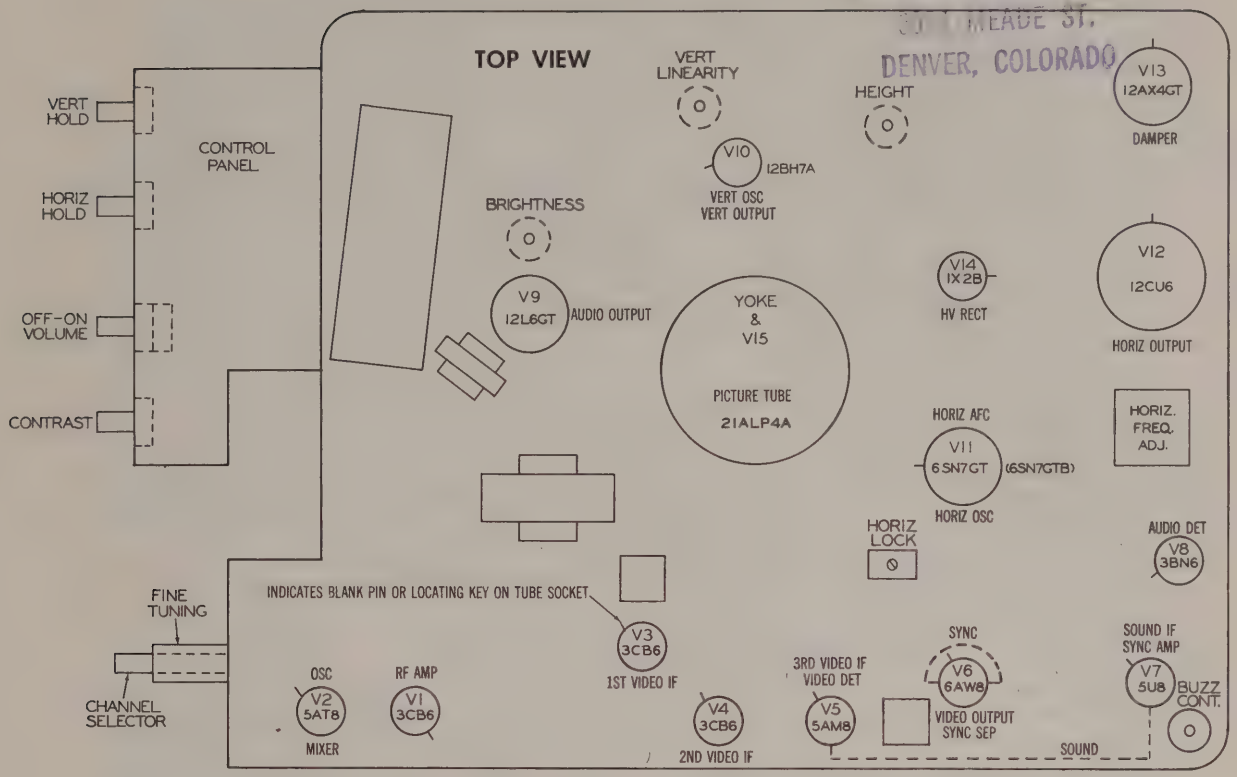
3[illegible] MEADE ST.
DENVER, COLORADO



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

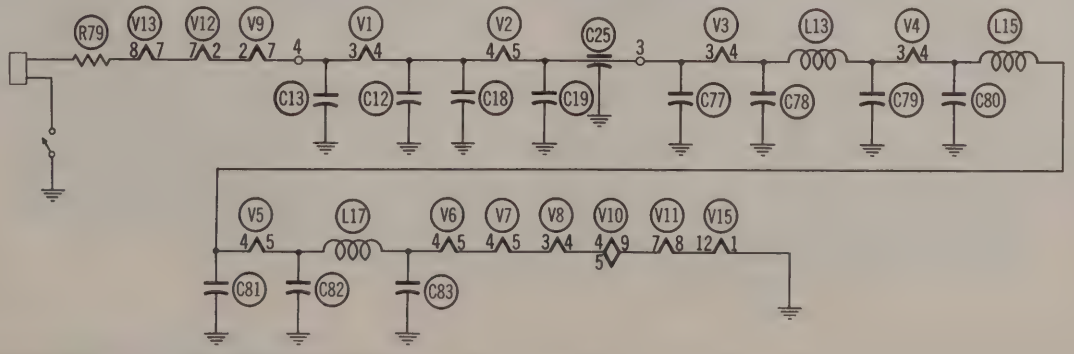
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifier (M1, M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V15**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V11**
No vert. or horiz. sync - **V6, V7**

SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, V14, M1, M2**
Vert. off freq. - **V7, V10**
Horiz. off freq. - **V7, V11**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A1900D, B1900D, C1900D, D1900D)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment. The high voltage shock hazard may be eliminated by removing ground connection from pin 8 (cathode) of horizontal output tube (V12).

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C40. Connect the positive lead to chassis. Two peaks may occur during alignment of the video IF coils. Use the peak with the slug entering the coil from the end nearest the chassis. The sound trap (A5) should be tuned with the slug entering the coil from the end away from the chassis. Use only enough sweep generator output for usable pattern on scope. If sweep generator has no built in marker, loosely couple a separate marker generator to sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to point Ⓑ. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	Any unused channel	Vert. Amp. thru detector probe (Fig.1) to pin 5 (plate) of first video IF amp. tube (V3). Low side to chassis.	A1, A2	Adjust A1 and A2 for response curve similar to Fig. 2 with markers in proper position. Remove scope and detector from pin 5 of V3.
2.	"	"	"	41.25MC 42.5MC 45.75MC	"	Vert. Amp. thru 3.3KΩ to point Ⓐ. Low side to chassis.	A3, A4, A5, A6	Adjust for response curve similar to Fig.3. Adjust A5 for MINIMUM amplitude at 41.25MC. A3 affects the high frequency end of the response curve and A4 affects the low frequency side. A6 affects center of response curve. Adjust A6 for maximum amplitude and MINIMUM tilt.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	.001MFD	High side to point Ⓐ. Low side to chassis.	Not used	4.5MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.4) to pin 11 (cathode) of picture tube. Low side to chassis.	A7	Rotate contrast control fully clockwise. Adjust A8 completely out of coil. Then adjust A7 for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set volume control for normal volume. Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of audio output transformer (T5).	A10	Set buzz control (R8) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum 400∿ indication on scope.
5.	"	"	"	"	"	"	A8, A9	Attenuate generator output so that signal level is below the limiting level of the 3BN6 as evidenced by background hiss and noise. Adjust A8 and A9 for maximum response on scope.
6.	"	"	Not used	4.5MC (400∿Mod)	"	"	R8	Use high signal generator output and adjust R8 for MINIMUM 400∿ indication on scope.
7.	"	"	4.5MC (400∿Mod) (50KC Swp)	4.5MC	"	"	A10	With volume control at low level retouch A10 for maximum 400∿ indication on scope. Remove test equipment. Connect antenna and tune in weakest station in that area and retouch R8 for MINIMUM buzz and hiss, Tune in strongest TV station in that area and adjust A10 for clearest sound.

VHF TUNER ALIGNMENT

The VHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

The UHF tuner portion has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

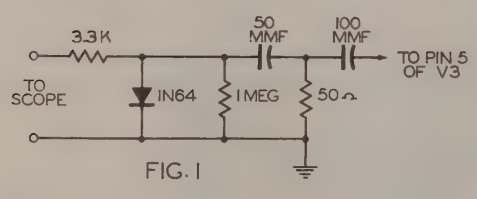


FIG. 1

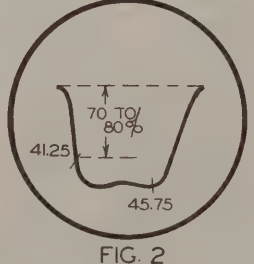


FIG. 2

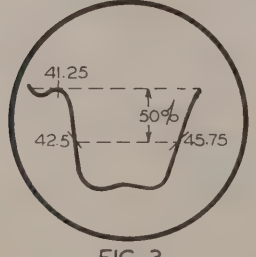


FIG. 3

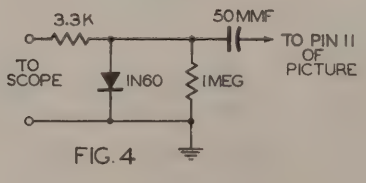
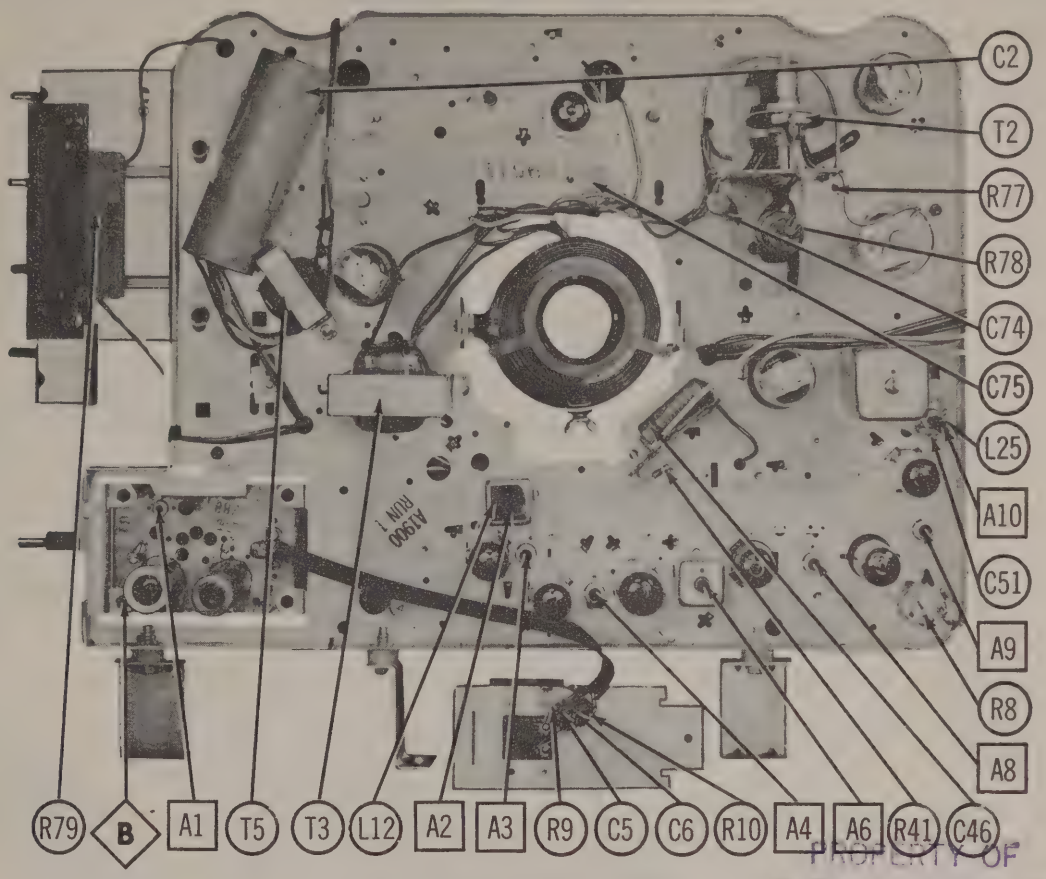
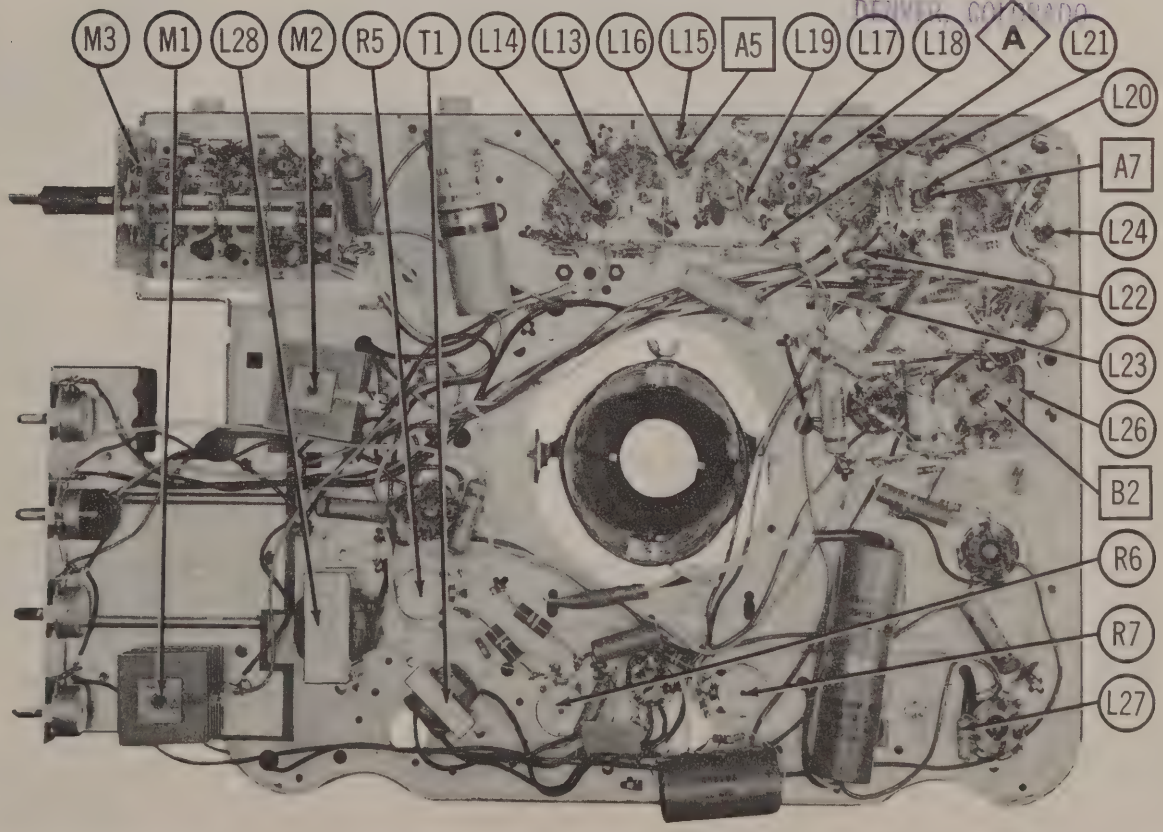


FIG. 4



CHASSIS TOP VIEW

PROPERTY OF
C. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

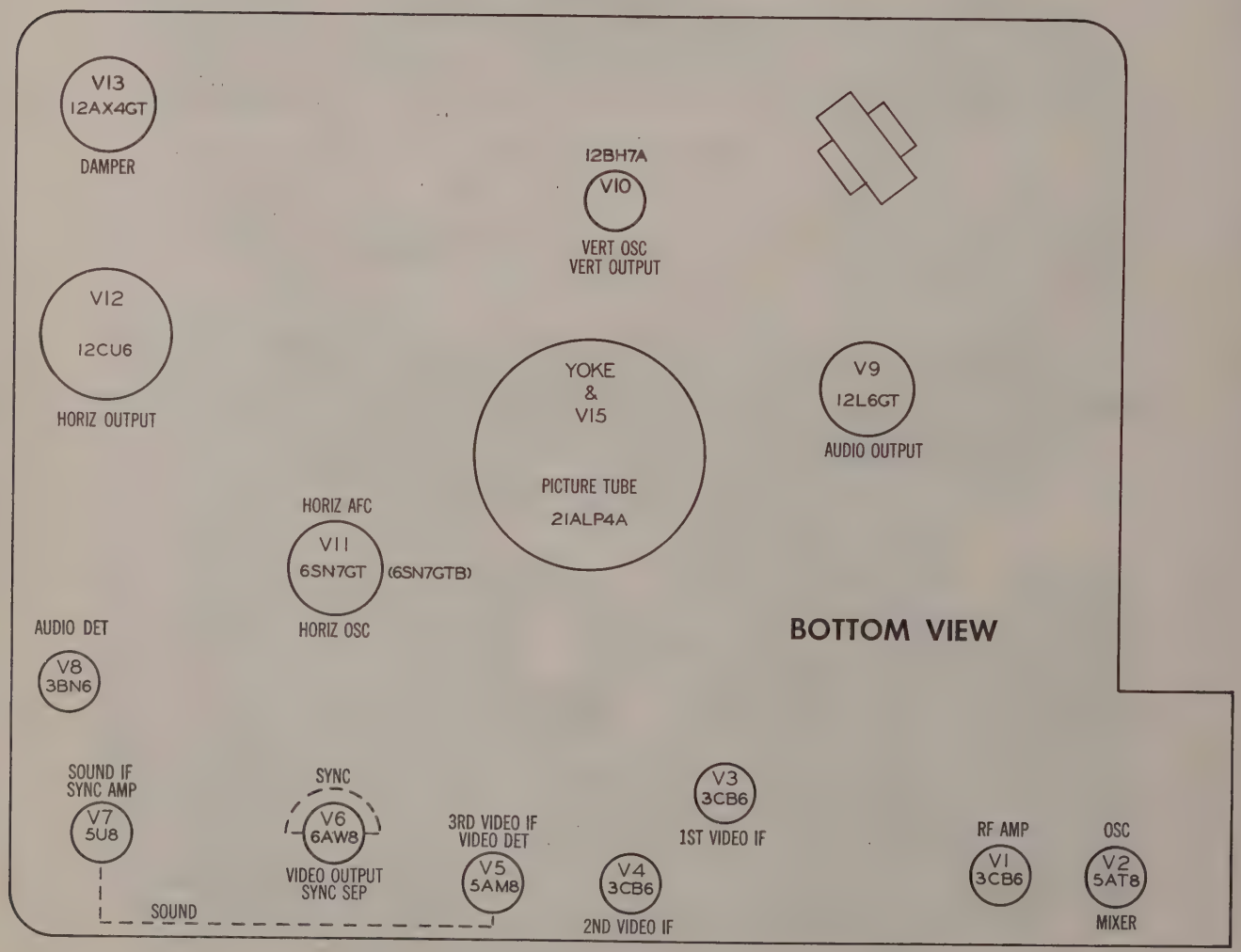


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3CB6	1Meg	0Ω	14Ω	13Ω	■ 700Ω	■ 700Ω	0Ω		
V2	5AT8	15KΩ	■ 9KΩ	0Ω	13Ω	12Ω	■ 1.2KΩ	■ 700Ω	0Ω	220KΩ
V3	3CB6	1Meg	47Ω	12Ω	11Ω	■ 1.2KΩ	■ 1.2KΩ	0Ω		
V4	3CB6	1Meg	47Ω	11Ω	10Ω	■ 1KΩ	■ 1KΩ	0Ω		
V5	5AM8	180Ω	12KΩ	■ 1KΩ	10Ω	8Ω	■ 1KΩ	.2Ω	5.6KΩ	0Ω
V6	6AW8	0Ω	2.2Meg	■ 1Meg	8Ω	7Ω	140Ω	1Meg	† 33KΩ	† 5.5KΩ
V7	5U8	■ 12KΩ	2.9Ω	■ 18KΩ	7Ω	6Ω	■ 18KΩ	150Ω	0Ω	47KΩ
V8	3BN6	250Ω	3.8Ω	6Ω	5Ω	■ 5.6KΩ	5.5Ω	† 330KΩ		
V9	12L6GT	TP	16Ω	† 260Ω	† 53Ω	300KΩ	TP	14Ω	90KΩ	
V10	12BH7A	▲ 1.3KΩ	▲ 2.5Meg	7KΩ	5Ω	5Ω	▲ 2.5Meg	550KΩ	0Ω	3Ω
V11	6SN7GT	700KΩ	† 100KΩ	300KΩ	250KΩ	† 28KΩ	0Ω	3Ω	2Ω	
V12	12CU6	TP	16Ω	NC	† 12KΩ	390KΩ	NC	19Ω	0Ω	TOP CAP ▲ 23Ω
V13	12AX4GTA	NC	TP	350KΩ	NC	† 53Ω	NC	19Ω	22Ω	
V14	1X2B		PINS	1-9	HAVE	INF	RESISTANCE			TOP CAP ▲ 190Ω
V15	21ALP4A	0Ω	0Ω	PIN 6 90KΩ	PIN 10 ▲ 390KΩ	PIN 11 ■ 250KΩ	PIN 12 2Ω			

■ MEASURED FROM 145 V LINE.
▲ MEASURED FROM PIN 3 OF V13.
† MEASURED FROM OUTPUT OF M2.
TP-TIE POINT
NC-NO CONNECTION



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3315 MEADE ST.
DENVER, COLORADO

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A19000, B19000, C19000, D19000)

ALTERNATE TUNER SCHEMATIC

UHF-VHF TUNER PART NO. ID2286 USED WITH CHASSIS B1900D AND D1900D

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	3CB6	3CB6	
V2	Osc.-Mixer	5AT8	5AT8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier-Video Detector	5AM8	5AM8	
V6	Video Output-Sync Sep.	6AW8	6AW8	
V7	Sound IF Amplifier-Sync Amplifier	5U8	5U8	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	12L6GT	12L6GT	
V10	Vert. Osc.-Vert. Output	12BH7A	12BH7A	
V11	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	6SN7GTB may be used as an alternate
V12	Horiz. Output	12CU6	12CU6	
V13	Damper	12AX4GTA	12AX4GTA	
V14	HV Rectifier	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V15	21ALP4A ①	21ALP4A ① 21ALP4B ① 21ALP4	21ALP4A ①	21ALP4A ② 21ALP4A/B 21ALP4	① Aluminized ② Silver screen "85"
	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	200	150	45B265	PRS150V200	BBRD101015	WS342	TD-200-200	S-110	TVL-1431
C2A	140	300	45B263			WQ505	CDB-1008	Q-163 FM-4540	
B	200	150							
C	5	300							
D	30	150							
C3A	200	200	45B312			WD345	CDB-200-5/200	D-100 FM-4504	
B	5	200							
C4	20	450	45B208	PRS450V20	BR2045	TC75	TD-20-450	FM-4520	TVA-1709

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	470	500	47X20B471M	BPD-00047	D6-471	5W5T47	GP2K-471	MC245	1FM-347	
C6	470	500	47X20B471M	BPD-00047	D6-471	5W5T47	GP2K-471	MC245	1FM-347	
C7	4.3									
C8	5.1									
C9	4.3									
C10	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C11	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C12	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	47			SI47	D6-470	TP29	GP1K-470	UC-5347	5GA-Q47	
C15	2			NP0-SI2.2	TCZ-2R2	Z005	NP0A-2R2		5TCCB-V22	
C16	1.5									
C17	10			NP0-SI10	TCZ-10	Z018	NP0A-100	ZT-541	5TCC-Q1	
C18	1000			BPD-001	DD-521	K069	801-001	DC-521	5HK-D1	
C19	1000			BPD-001	DD-521	K069	801-001	DC-521	5HK-D1	
C20	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C21	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C22	62									
C23	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C24	1000			EF-001	MFT-1000					
C25	1000			EF-001	MFT-1000					
C26	.1	200	46A243	P288N-1	DF-104	CUB4P1		PT401	2TM-P1	
C27	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C28	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	24		47CA20A240J	SI24	D6-250	TZ15	GP1K-240	UC-5425	5GA-Q25	
C30	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	39			NP0-SI39	TCZ-39	TZ20	NP0L-390		5TCC-Q39	
C34	24		47CA20A240J	SI24	D6-250	TZ15	GP1K-240	UC-5425	5GA-Q25	
C35	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C38	10		47CA20100F	SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C39	4.7		47A160-6	NP0-SI4.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCC-Q1	
C40	.25	100	46AT254J	P288N-25		CUB2P25		PT4025	2TM-P25	
C41	68		47B479							
C42	4.7		47A160-6	NP0-SI4.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCCB-V47	
C43	33		47B478	N080-SI33						
C44	.1	150	46AU104J	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C45	20000		47A242	BPD-02	DF-203	K085	817-02	PT612	5HK-S2	
C46	.1	400	46AV104J	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C47	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	33		47B478	N080-SI33						
C49	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	.01	200	46AU103J	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C51	15		47B480							
C52	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C53	.02	600	46AZ203J	BPD-02	DF-203	CUB6S2	817-02	PT612	6TM-S2	
C54	.02	600	46AZ203J	BPD-02	DF-203	CUB6S2	817-02	PT612	6TM-S2	
C55A	270			BPD-00027		TP41	GP2K-271	UC-5327	5GA-T27	
B	10000		†49A046	BPD-01	†PC-263	K082	811-01	DC-511	5HK-S1	
C	25			BPD-000025		TP25	GP1K-250	UC-5425	5GA-Q25	
C56	.05	200	46AU503J	BPD-05	DF-503	CUB2S5		PT415	4TM-S5	
C57	33		47CA20A330M	SI33	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C58A	4700		♦49A044	BPD-0047	♦PC-106	K079	811-0047	DC-525	5HK-D47	
B	4700			BPD-0047		K079	811-0047	DC-525	5HK-D47	
C59	.01	400	46BR103E4	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C60	470		47CA20A471K	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C61	.047	400	46BR473E4	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C62	5000		47A168	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C63	20		47CA20200K	SI20	D6-200	TZ13	GP1K-200	UC-542	5GA-Q2	
C64	.05	400	46AW503J	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C65	.02	200	46AU203J	BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C66	.25	100	46AT254J	P288N-25		CUB2P25		PT4025	2TM-P25	

PARTS LIST AND CAPACIT

ITEM No.	RATING: CAP.	RATING: VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.
C67	33		47B478	N080-SI33	
C68	220	500	47X20B221K	NP0-SI220	D6-221
C69	.01	400	46C244		
C70	20000		47A242	BPD-02	DF-203
C71	1300	500	47X30B132K	1464-0013	
C72	.05	400	46AW503J	BPD-05	DF-503
C73	10000		47A224	BPD-01	DD-103
C74	.08	200	46AU803F		
C75	56	2000	47A555		DD30-560
C76	68	2000		HVD-30-68	DD30-680
C77	1000		47A230	BPD-001	DD-102
C78	1000		47A230	BPD-001	DD-102
C79	1000		47A230	BPD-001	DD-102
C80	1000		47A230	BPD-001	DD-102
C81	1000		47A230	BPD-001	DD-102
C82	1000		47A230	BPD-001	DD-102
C83	1000		47A230	BPD-001	DD-102
C84	5000	1000	47A485	BPD-005	DD-502

† Items C55A, C55B, C55C, R50A and R50B are combined in one u
♦ Items C58A, C58B, R56A and R56B are combined in one unit.

CONT

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT: Hallicrafters PART No.	CENTRALAB PART No.	CLAROST/ PART No
R1A	1.25Meg	½	25B176	B-69♦	A47-1Meg-
B	Shaft		Not Req.	Not Req.	FS-3
R2A	145KΩ	½	25B100	B-35 †	A47-75K-S
B	Shaft		Not Req.	Not Req.	FS-3
R3A	330KΩ	½	25B101	B-60-S	A47-500K-
B	Shaft		Not Req.	Not Req.	FS-3
C	Switch		Not Req.	Not Req.	SWE-12
R4A	1500Ω	½	25B102	AB-515	
B	Shaft		Not Req.	AK-3	
R5A	5Meg	½	25B1096		
B	Shaft		Not Req.		
R6A	750Ω	½	25B1099	AB-5	A47-750-S
B	Shaft		Not Req.	AK-19	RN-3
R7A	5Meg	½	25B1098	AB-86 *	A47-4Meg-
B	Shaft		Not Req.	AK-19	RN-3
R8	500Ω	2	25A1095		39-500

♦ Connect a 250KΩ resistor in series with the right hand terminal of the original control (control viewed from shaft end, terminal
† Connect a 68KΩ resistor in series with the left hand terminal of of the original control (control viewed from shaft end, terminals
* Connect a 1Meg resistor in series with the left hand terminal of the original control (control viewed from shaft end, terminals do

RESISTO

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R9	470KΩ	½	23X20X474K	BTS-470K	
R10	470KΩ	½	23X20X474K	BTS-470K	
R11	15KΩ	½		BTS-15K	
R12	33KΩ	½		BTS-33K	
R13	470Ω	½		BTS-470	
R14	1000Ω	½		BTS-1000	
R15	15KΩ	½			
R16	8200Ω	½			
R17	220KΩ	½		BTS-220K	
R18	470Ω	½		BTS-470	
R19	1000Ω	½		BTS-1000	
R20	1000Ω	½	23X20X102K	BTS-1000	
R21	3300Ω	½	23X20X332K		
R22	4700Ω	½	23X20X472K	BTS-4700	
R23	1000Ω	½	23X20X102K	BTS-1000	
R24	47Ω	½	23X20X470K	BTS-47	
R25	220Ω	½	23X20X221K	BTS-220	
R26	18KΩ	½	23X20X183K		
R27	1000Ω	½	23X20X102K	BTS-1000	
R28	1000Ω	½	23X20X102K	BTS-1000	
R29	47Ω	½	23X20X470K	BTS-47	
R30	12KΩ	½	23X20X123K		
R31	1000Ω	½	23X20X102K	BTS-1000	
R32	1000Ω	½	23X20X102K	BTS-1000	
R33	180Ω	½	23X20X181K	BTS-180	
R34	1Meg	½	23X20X105K	BTS-1Meg	
R35	5600Ω	½	23X20X562K	BTS-5600	
R36	1Meg	½	23X20X105K	BTS-1Meg	
R37	5500Ω	5	24-1046		
R38	33KΩ	1	23X30X333K	BTA-33K	
R39	390KΩ	½	23X20X394K	BTS-390K	
R40	280KΩ	½	23X20X824K	BTS-820K	
R41	100KΩ	½	23X20X104K	BTS-100K	
R42	18KΩ	½	23X20X183K	BTS-18K	
R43	150Ω	½	23X20X151K	BTS-150	
R44	470Ω	½	23X20X471K	BTS-470	
R45	5600Ω	1	23X30X562K	BTA-5600	
R46	560KΩ 5%	½	23X20X564J	BTS-560K 5%	

Note 1. Some versions use a 100K
† Items R50A, R50B, C55A, C55
♦ Items R56A, R56B, C58A, C58

TRANSFORMERS (S

ITEM No.	USE	Hallicrafters PART No.	Halldorson PART No.	Merit PART No
T1	Vert. Osc. Trans.	55B250		A-3006
T2	Horiz. Output Trans.	55A274	FB418 *	HVO-37
T3	Vert. Output Trans.	55C260	Z1807	A-2824
T4A	Yoke (90°) Horiz. (20MH)	53D325	DF607 ① ②	MDF-92
B	Vert. (40MH)			

① Use original rear cover and centering device.
② Use original yoke damping network.

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters Part No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	5CB6	5CB6	
V2	Osc.-Mixer	5AT9	5AT9	
V3	1st Video IF Amplifier	5CB6	5CB6	
V4	2nd. Video IF Amplifier	5CB6	5CB6	
V5	3rd. Video IF Amplifier-Video Detector	5AM8	5AM8	
V6	Video Output-Sync Sep.	6AW8	6AW8	
V7	Sound IF Amplifier-Sync Amplifier	5U8	5U8	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	1SL6GT	1SL6GT	
V10	Vert.Osc.-Vert. Output	12BH7A	12BH7A	
V11	Horiz. AFC-Horiz.Osc.	6SN7GT	6SN7GT	6SN7GTB may be used as an alternate
V12	Horiz. Output	12CU6	12CU6	
V13	Damper	1LA4/40TA	1LA4/40TA	
V14	HV Rectifier	1K3B	1K3B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters Part No.	CBS Part No.	GENERAL ELECTRIC Part No.	SYLVANIA Part No.	NOTES
V15	21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ②	② Aluminized
		21ALP4B ①	21ALP4B ①	21ALP4A/B ①	① Silver screen "B5"
		21ALP4	21ALP4	21ALP4	
	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ①	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: Hallicrafters Part No.	AEROVOX Part No.	CORNELL-DUBILIER Part No.	MALLORY Part No.	PYRAMID Part No.	SANGAMO Part No.	SPRAGUE Part No.
C1A	300	150	45B365	PRS150V300	BSRD10105	WS342	TD-300-300	S-150	TVL-1431
B	140	300	45B363			WQ505	CDB-1068	Q-125	
C	5	300						FM-4560	
D	30	150							
C3A	300	300	45B313			WD345	CDB-300-5/300	D-100	
B	5	300						FM-4504	
C4	30	450	45B308	PRS450V30	BR3045	TC75	TD-30-450	FM-4320	TVA-1709

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Hallicrafters Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C5	470	500	47X309A71M	BPD-00047	DS-471	SW5747	GPZK-471	MC345	1FM-347	
C6	470	500	47X309A71M	BPD-00047	DS-471	SW5747	GPZK-471	MC345	1FM-347	
C7	4.3									
C8	5.1									
C9	4.3									
C10	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C11	560			S2B80	DS-561	TP50	GPZK-681	DC-5368	5GA-T68	
C12	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C13	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C14	47			S147	DS-470	TP39	GPZK-470	UC-5347	5GA-Q47	
C15	2			NPO-S13.2	TCZ-2R2	Z005	NPOA-2R2		5TCCB-V22	
C16	L.S									
C17	10			NPO-S10	TCZ-10	Z018	NPOA-100	UC-541	5TCC-Q1	
C18	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C19	1000			BPD-001	DD-521	K049	801-001	DC-521	5HK-D1	
C20	680			S2B80	DS-681	TP50	GPZK-681	UC-5368	5GA-T68	
C21	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C22	63									
C23	1000			BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C24	1000			KF-001	MFT-1000					
C25	1000			KF-001	MFT-1000					
C26	.1	300	46A343	PS89N-1	DF-104	CU84P1		PT401	3TM-P1	
C27	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C28	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C29	34		47CA39A340J	S2E4	DS-350	TZ15	GPZK-340	UC-5425	5GA-Q25	
C30	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C32	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C33	39			NPO-S39	TCZ-39	TZ30	NP0L-390	UC-5425	5TCC-Q39	
C34	34		47CA30A340J	S2E4	DS-350	TZ15	GPZK-340	UC-5425	5GA-Q25	
C35	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C36	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C37	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C38	10		47CA30D0P	S130	DS-100	TP09	GPZK-100	UC-541	5CA-Q	
C39	4.7		47A180-E	NPO-S14.7	TCZ-4R7	TZ07	NPOA-4R7	ZT-5547	5TCC-Q1	
C40	.25	100	46A72547	PS86N-25		CU82P25		PT4025	3TM-P25	
C41	56		47B470							
C42	4.7		47A180-E	NPO-S14.7	TCZ-4R7	TZ07	NPOA-4R7	ZT-5547	5TCCB-V47	
C43	33		47B478							
C44	.1	150	46A12037	PS82P-1	DF-104	CU83P1		PT401	3TM-P1	
C45	30000		47A343	BPD-03	DF-303	K085	817-02	PT613	5HK-S3	
C46	.1	400	46A11042	PS85N-1	DF-104	CU84P1		PT401	4TM-P1	
C47	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	33		47B478							
C49	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	.01	200	46A11032	BPD-01	DS-103	CU84S1	GP3-333-103	PT411	4TM-S1	
C51	15		47B480							
C52	1000		47A330	BPD-001	DD-102	K049	801-001	DC-521	5HK-D1	
C53	.02	600	46A12032	BPD-02	DF-203	CU83S2	817-02	PT613	5TM-S2	
C54	.02	600	46A12032	BPD-03	DF-203	CU83S2	817-02	PT613	5TM-S2	
C54A	370			BPD-00027			TP41	GPZK-371	UC-5327	5GA-T27
B	10000		†49A046	BPD-01	†PC-383	K082	811-01	DC-51	5HK-01	
C	75			BPD-0000025			TP41	GPZK-250	UC-5425	5GA-Q25
C56	.05	200	46A12032	BPD-05	DF-503	CU83S5		PT415	4TM-S5	
C57	33		47CA30A330M	S2E3	DS-330	TP37	GPZK-330	UC-5433	5GA-Q33	
C58A	4700		†48A046	BPD-0047	†PC-105	K079	811-0047	DC-525	5HK-D47	
B	4700			BPD-0047		K079	811-0047	DC-525	5HK-D47	
C59	.01	400	46BR103E4	BPD-01	D6-103	CU84S1	GP3-333-103	PT411	4TM-S1	
C60	470		47CA30A471K	S2470	DS-471	TP46	GPZK-471	UC-5347	5GA-T47	
C61	.047	400	46BR473E4	BPD-05	DF-503	CU84S7		PT4147	4TM-S47	
C62	5000		47A188	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C63	30		47CA30300K	S130	DS-300	TZ15	GPZK-300	UC-543	5GA-Q3	
C64	.05	400	46AW503J	BPD-05	DF-503	CU84S5		PT415	4TM-S5	
C65	.02	300	46A12032	BPD-02	DF-203	CU83S2	817-02	PT413	3TM-S2	
C66	.15	100	46A72547	PS86N-25		CU82P25		PT4025	3TM-P25	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Hallicrafters Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C67	33		47B478	NO80-S133						
C68	220	500	47X305B21K	NP0-S1330	D6-331	IZH5T23	811-321	MC1S40	MS-123	
C69	.01	600	46C344						47M-21	
C70	30000		47A343	BPD-03	DF-303	K085	817-01	PT613	5HK-S3	
C71	1500	500	47X301A32K	1454-0033		IH5D23			MS-313	
C72	.05	600	46AW5037	BPD-05	DF-503	CU83S5		PT415	4TM-S5	
C73	10000		47A334	BPD-01	DD-103	K063	811-01	DC-51	5HK-01	
C74	.08	300	46AL8031F							
C75	56	2000	47A555			DD30-560		3KV-560	DC30456	3GA-Q56
C76	68	2000				DD30-680		3KV-680	DC30468	3GA-Q68
C77	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C78	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C79	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C80	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C81	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C82	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C83	1000		47A330	BPD-001		DD-102	K049	801-001	DC-521	5HK-D1
C84	5000	1000	47A685	BPD-005		DD-502	K080	1N5EV-472		5HK-D5

† Items C55A, C55B, C55C, R50A and R50B are combined in one unit.
* Items C58A, C58B, R56A and R56B are combined in one unit.

CONTROLS

ITEM No.	RATING: RESIST. ANCE	WATTS	REPLACEMENT DATA: Hallicrafters Part No.	CENTRALAB Part No.	CLAROSTAT Part No.	IRC Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	1 .25Meg	½	25B1176	B-58*	A47-1Meg-S *	Q11-137 *	TA16L *	Vertical Hold, Stop at 250KΩ
B	Shaft		Not Req.	Not Req.	F3-3	Not Req.	Not Req.	Attach to R1A.
R2A	145KΩ	½	25B1100	B-35 †	A47-75K-61	Q11-126 †	U-43 †	Horizontal Hold, Stop at 75KΩ
B	Shaft		Not Req.	Not Req.	F3-3	Not Req.	Not Req.	Attach to R2A.
R3A	330KΩ	½	25B1101	B-50-S	A47-500K-Z	Q13-132	TA334A	Volume
B	Shaft		Not Req.	Not Req.	F3-3	Not Req.	Not Req.	Attach to R3A.
C	Switch		Not Req.	Not Req.	SWE-13	T6-1	U3-38	Attach to R3A.
R4A	1500Ω	½	25B1102	AB-515		Q17-109	U-5	Contrast
B	Shaft		Not Req.	AK-3		Not Req.	Not Req.	Attach to R4A.
R5A	5Meg	½	25B1095			Q17-141	TA75GR	Brightness
B	Shaft		Not Req.			TQ	Not Req.	Attach to R5A.
R6A	1500Ω	½	25B1099	AB-5	A47-750-S	Q11-105	TA27SLL	Vertical Linearity
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R6A.
R7A	1Meg	½	25B1098	AB-56 *	A47-1Meg-S *	Q11-141 *	TA29SCL *	Height Stop at 6Meg
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R7A.
R8	5000	2	25A1095		2S-500			Buzz (Wire Wound)

* Connect a 250KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Connect a 68KΩ resistor in series with the left hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
* Connect a 1Meg resistor in series with the left hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Hallicrafters Part No.	IRC Part No.	NOTES
R9	470KΩ		23X30X474K	BTS-470K	
R10	470KΩ		23X30X474K	BTS-470K	
R11	15KΩ			BTS-15K	
R12	33KΩ			BTS-33K	
R13	470Ω			BTS-470	
R14	100KΩ		23X30X104K	BTS-100K	
R15	15KΩ			BTS-15K	
R16	820Ω			BTS-820	
R17	220KΩ			BTS-220K	
R18	470Ω			BTS-470	
R19	100Ω			BTS-100	
R20	100Ω		23X30X102K	BTS-1000	
R21	330Ω		23X30X332K		
R22	470Ω		23X30X473K	BTS-4700	
R23	100Ω		23X30X102K	BTS-1000	
R24	47Ω		23X30X470K	BTS-47	
R25	220Ω		23X30X221K	BTS-220	
R26	18KΩ		23X30X183K		
R27	1000Ω		23X30X102K	BTS-1000	
R28	100Ω		23X30X102K	BTS-1000	
R29	47Ω		23X30X470K	BTS-47	
R30	12KΩ		23X30X123K		
R31	1000Ω		23X30X102K	BTS-1000	
R32	1000Ω		23X30X102K	BTS-1000	
R33	180Ω		23X30X181K	BTS-180	
R34	1Meg		23X30X105K	BTS-1Meg	
R35	5600Ω		23X30X562K	BTS-5600	
R36	1Meg		23X30X105K	BTS-1Meg	
R37	5600Ω		23X30X562K		
R38	33KΩ		23X30X333K	BTA-33K	
R39	390KΩ		23X30X394K	BTS-390K	
R40	820KΩ		23X30X824K	BTS-820K	
R41	100KΩ		23X30X104K	BTS-100K	
R42	18KΩ		23X30X183K	BTS-18K	
R43	150Ω		23X30X151K	BTS-150	
R44	47KΩ		23X30X473K	BTS-47K	
R45	560KΩ		23X30X563K	BTA-560K	
R46	560KΩ	0%	23X30X564J	BTS-560K 5%	

Note 1. Some versions use a 100KΩ ½W resistor in this application.
† Items R50A, R50B, C55A, C55B, C55C are combined in one unit.
* Items R56A, R56B, C58A, C58B are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters Part No.	Holloborn Part No.	Merit Part No	RCA TYPE No	Rom Part No.	Stancor Part No	Thordarson Part No	Triad Part No
T1	Vert. Osc. Trans.	25B250		A-3008					
T2	Horiz. Output Trans.	55A274	FB418 *	HVO-37 *		X123 *	A-8263 *	FLY-25 *	D-48 *
T3	Vert. Output Trans.	55C280	Z1807	A-2824					
T4A	Yoke (90°) Horiz.	53D335	DF607 ① ②	MDF-92 ① ②	33DD1 ①	Y90F10/ 43 ① ②	DY-16A ① ②	Y-16 ① ②	T-41-1 ① ②
	(20MH)								
B	Vert. (40MH)								

① Use original rear cover and centering device.
② Use original yoke damping network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Holloborn Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	6	6	6	6	6	6	6
5	3	3	3	3	3	3	3
2	5	5	5	5	5	5	5
8	2	2	2	2	2	2	2

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: Hallicrafters Part No.	Holloborn Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T5	2.4KΩ	3.3Ω	55-191 53B248 ①	Z1005	A-2928	A-3676	24S50	S-1X	① Alternate audio output transformer.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: Hallicrafters Part No.	QUAM. Part No.	RCA TYPE No	NOTES
SP1	4"	PM	3.2Ω	85C175A 85C175 ①	4A07	223S1	① Alternate 4" PM speaker.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: Hallicrafters Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	Ant. Trans.	.2KΩ	0Ω					
L2	Ant. Coils	0Ω						
L3	Ant. Coil	0Ω						Channel 6
L4	Ant. Coil	0Ω						Channel 13
L5	RF Coil	0Ω						Channel 13
L6	RF Coil	0Ω						Channel 6
L7A	RF Coils	0Ω						
B	RF Shunt Coils	0Ω						Low channels
L8	Osc. Coil	0Ω						Channel 13
L9	Osc. Coil	0Ω						Channel 6
L10	Osc. Coils	0Ω						
L11	Conv. Plate	.3Ω						
L12	1st Video IF	.1Ω		51A1926	17-4304 *	TV-125 *	6234 *	
L13	Fil. Choke	0Ω		53A1921	19-3501		6171	
L14	2nd Video IF	.1Ω		51A1925	17-4301 *	TV-130 *	6235	. 4 Microhenry
L15	Fil. Choke	0Ω		53A1921	19-3501		6171	
L16	3rd Video IF	.1Ω		51A1924	17-4301	TV-132	6233 *	Includes 4.5MC Trap
L17	Fil. Choke	0Ω		53A1921	19-3501		6171	. 4 Microhenry
L18	4th Video IF	.2Ω	.2Ω	50A654	17-5004 *	TV-126 *	6234 *	
L19	Series Peaking Coil	4.4Ω		53A307	19-1006		6654	16 Microhenries;
L20A	4.5MC Trap	.9Ω		51A1996				
B	Ist Sound IF	2.8Ω						
L21	Series Peaking Coil	6Ω		51-1993	19-4380	TV-134 †	6130 †	150 Microhenries; Wound on 33KΩ resistor
L22	Series Peaking Coil	13Ω		51-1947	19-3500 #		6164 #	57H Microhenries; Wound on 18KΩ resistor
L23	Shunt Peaking Coil	18Ω		51A1997	19-4080		4663	1080 Microhenries; Note 1
L24	2nd Sound IF	1.8Ω	3.8Ω	51A1859				
L25	Quadrature Coil	5.5Ω		51A1857	20-1005	TV-131	1480	
L27	RF Choke	5.5Ω		53-343				?. 5 Microhenries; IRC Part No. CLA

Note 1. L23 may be wound on 12KΩ resistor in some versions.
* Delone trap.
= Cut out chassis hole, use adaptor plate and use one winding.
▲ Use one winding only.
+ Use adaptor plate.
† Parallel with 22KΩ resistor.
# Parallel with 18KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.: PRI.	SEC.	REPLACEMENT DATA: Hallicrafters Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	RCA TYPE No	Rom Part No.	Thordarson Part No	NOTES
L26	16Ω	35Ω	50C548	20-1402 =	TV-143 =	6183 =	205R1 =	H-100 =	H5-3 =	= Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: Hallicrafters Part No.	Holloborn Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No	Triad Part No
L28	.200ADC	53Ω	.95HY	56H187		C5040	C-2994	C-3237	28C41	C-21X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: Hallicrafters Part No.	FEDERAL Part No.	INTERNATIONAL Part No.	MALLORY Part No.	RADIO RECEPTOR Part No.	SARKES TARZIAN Part No.	NOTES
M1	.200ADC	27A218	1238A	MR300	[illegible]	5Q1	300	
M2	.300ADC	27A218	1238A	MR300	65300	5Q1	300	

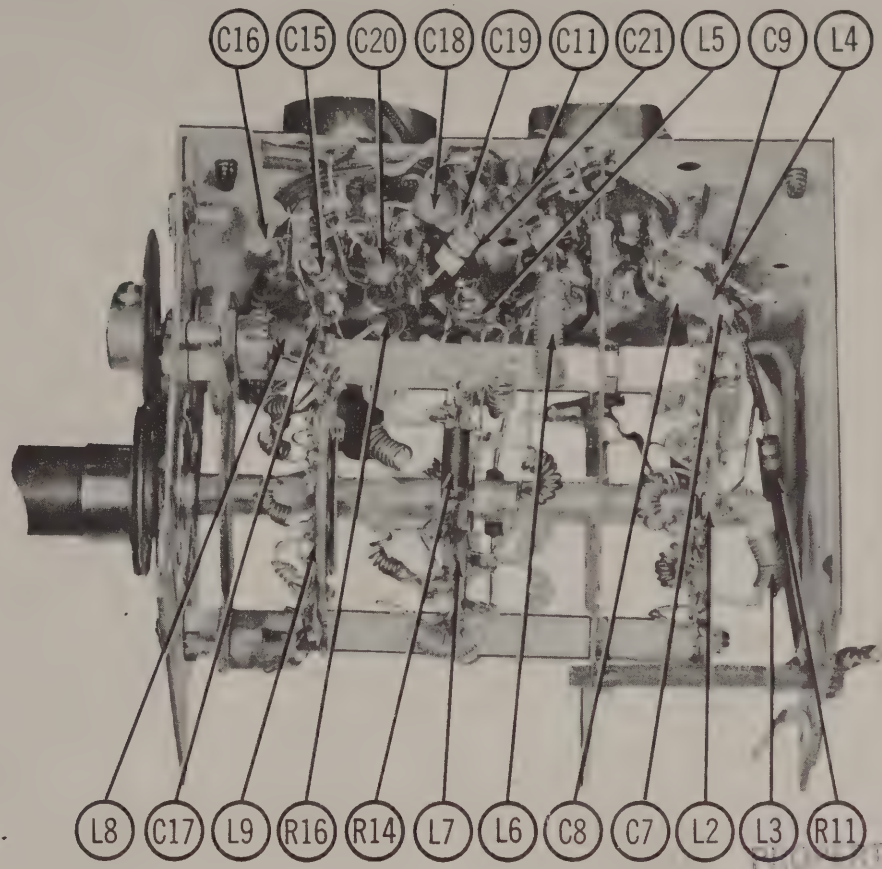
PROPERTY OF [illegible] SHIP

HALLICRAFTERS MODELS 21T440B, M, 21T441B, M, 24T450B, M, 24T451B, M (Ch. A19000, B19000, C19000, D19000)

PARTS LIST AND DESCRIPTIONS (Continued)

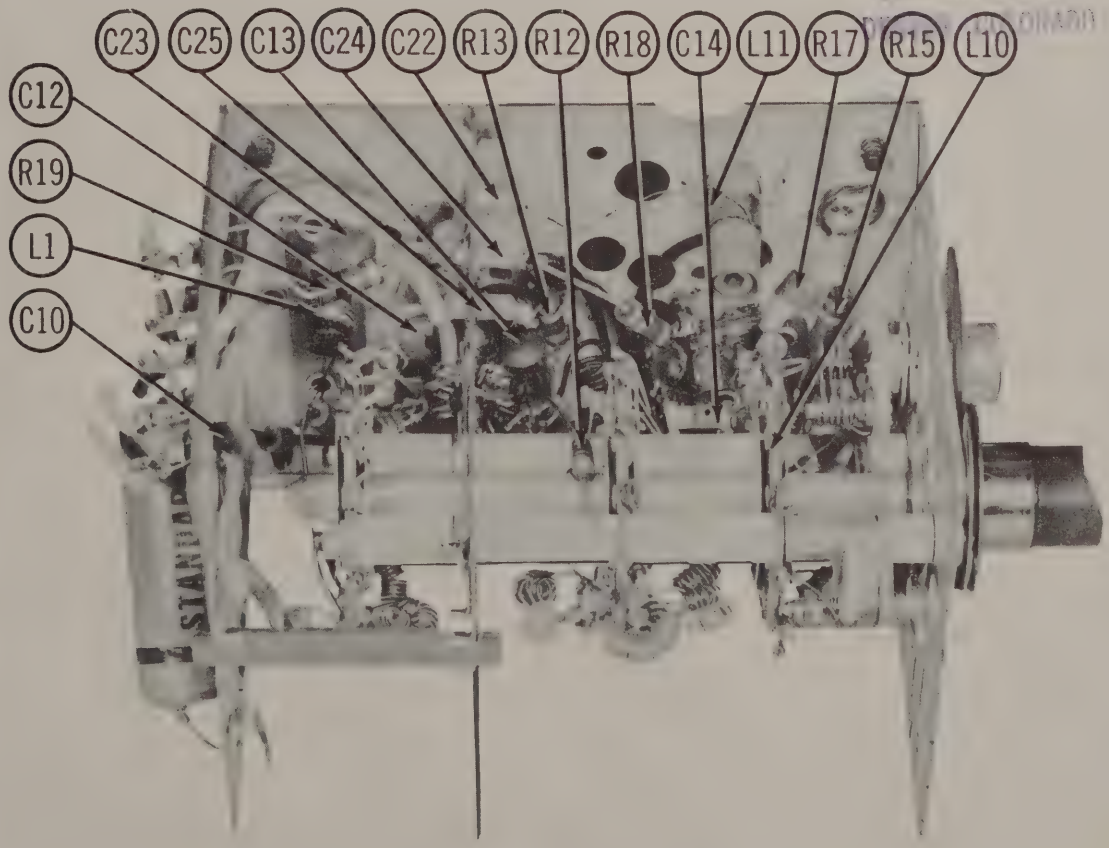
MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M3	Tuner	1E2288	VHF-Chassis A1900D, C1900D
M4	Tuner	1E2286	VHF-UHF Combination-Chassis B1900D, D1900D
M5	Centering Device		Part of Deflection Yoke (T4) Rear Cover
M6	Ion Trap	21B189	
B3	Trimmer Cap.	44A448	Horiz. Lock (10-160MMF)
	Cabinet	78F1204	Models 24T451M, 24T450M
	Cabinet	78F1205	Models 24T451B, 24T450B
	Cabinet	78-1200	Models 21T441M, 21T440M
	Cabinet	78-1201	Models 21T441B, 21T440B
	Knob	15A769	VHF Channel Selector-Models 21T440M, 24T450M
	Knob	15C797	VHF Channel Selector-Models 21T440B, 24T450B
	Knob	15-824	VHF Channel Selector-Models 24T451M, 21T441M
	Knob	15-825	VHF Channel Selector-Models 24T451B, 21T441B
	Knob	15A775	Control (4 used)-Models 21T440M, 24T450M
	Knob	15A798	Control (4 used)-Models 21T440B, 24T450B
	Knob	15-834	Control (4 used)- Models 24T451M, 21T441M
	Knob	15-833	Control (4 used)-Models 24T451B, 21T441B
	Knob	15A762	Fine Tuning-Models 21T440M, 24T450M, 21T440B, 24T450B
	Knob	15-826	Fine Tuning-Models 24T451M, 21T441M
	Knob	15-827	Fine Tuning-Models 24T451B, 21T441B
	Knob	15-828	UHF Tuning-Models 21T441M, 24T451M
	Knob	15-829	UHF Tuning-Models 24T451B, 21T441B
	Knob Insert	15-830	Calibrated UHF-Models 24T451M, 24T451B, 21T441M, 21T441B
	Mask	7-575	Models 21T440M, 21T440B, 21T441M, 21T441B
	Mask	7A611	Models 24T451M, 24T451B, 24T450M, 24T450B
	Safety Glass	22-424	Models 21T440M, 21T440B, 21T441M, 21T441B
	Safety Glass	22A455	Models 24T451M, 24T451B, 24T450M, 24T450B

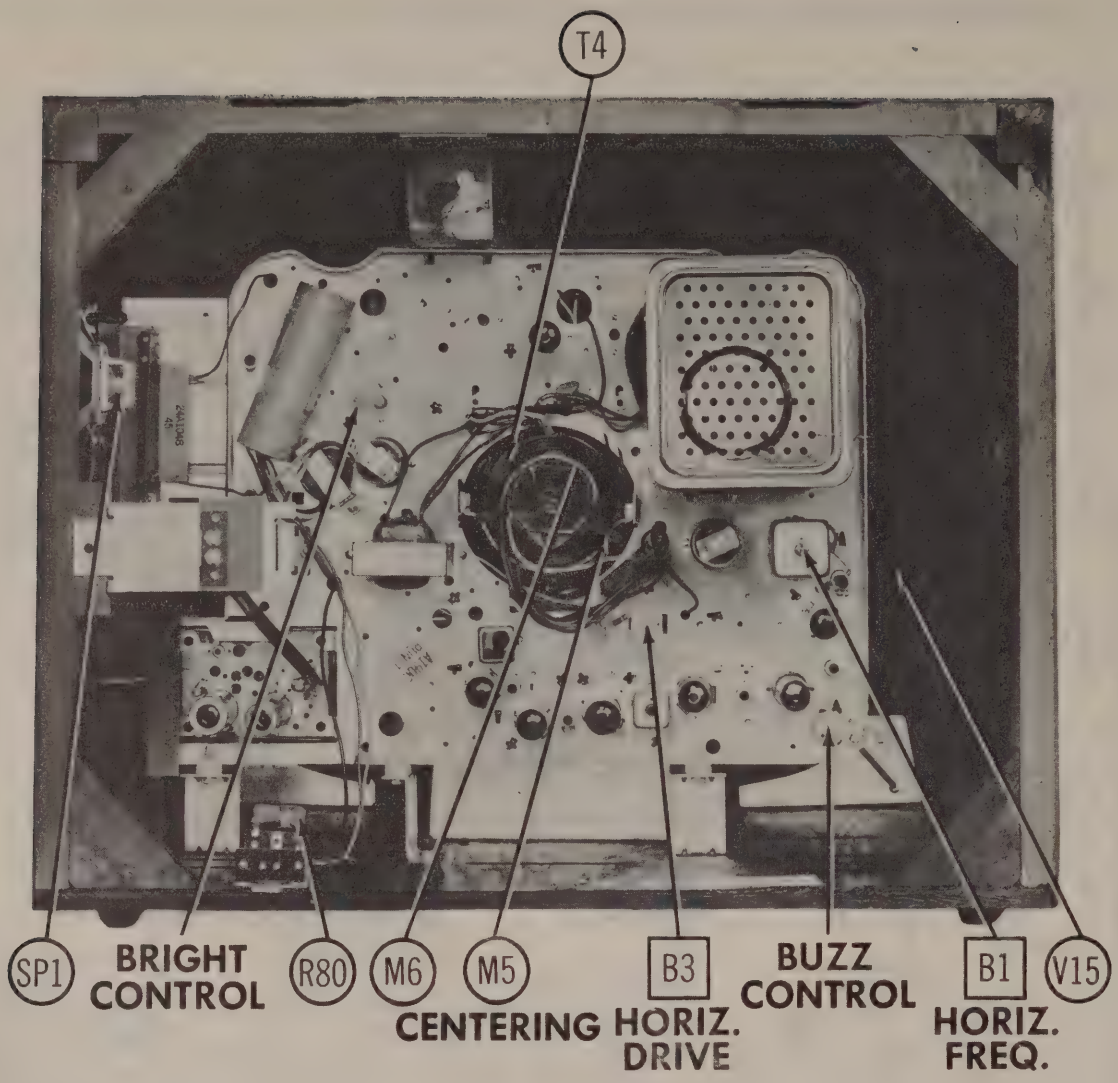


RF TUNER-RIGHT SIDE

PROPERTY OF
L. F. ELLINGSHIP
3001 MAPLE ST
DENVER, COLORADO



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Preset the horizontal lock trimmer (B3) one-half turn from maximum clockwise position.

2. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

3. Connect the vertical amplifier of the oscilloscope thru a 10MMF capacitor to lug "4" of the horizontal oscillator transformer (L26). Connect the low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 5 is obtained. While making this adjustment keep the picture in sync with the horizontal hold and if necessary B1 and B3.

4. Remove scope from lug "4" of L26. Turn the horizontal hold control fully counter clockwise. Turn B1 counter clockwise until the picture just loses sync, then turn B1 clockwise until picture is just ready to pull-in sync.

5. Turn the horizontal hold control fully clockwise. Picture should remain in sync. Momentarily remove signal by switching off channel and back again. Turn the horizontal hold control counter clockwise slowly until picture just falls into sync. If more than 3 bars are present just before picture falls into sync, adjust the horizontal lock trimmer (B3) slightly clockwise. If less than 3 bars are present, adjust B3 slightly counter clockwise. Repeat steps 4 and 5 until the effective pull-in range of the horizontal hold control is from 60 to 120 degrees.

6. In weak signal areas, adjust the horizontal hold control so that when switching off channel and back again the picture returns completely in sync.

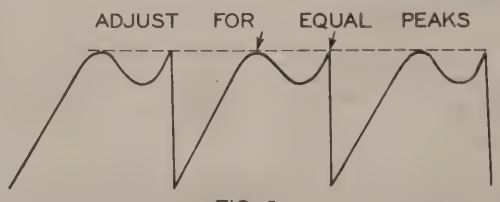
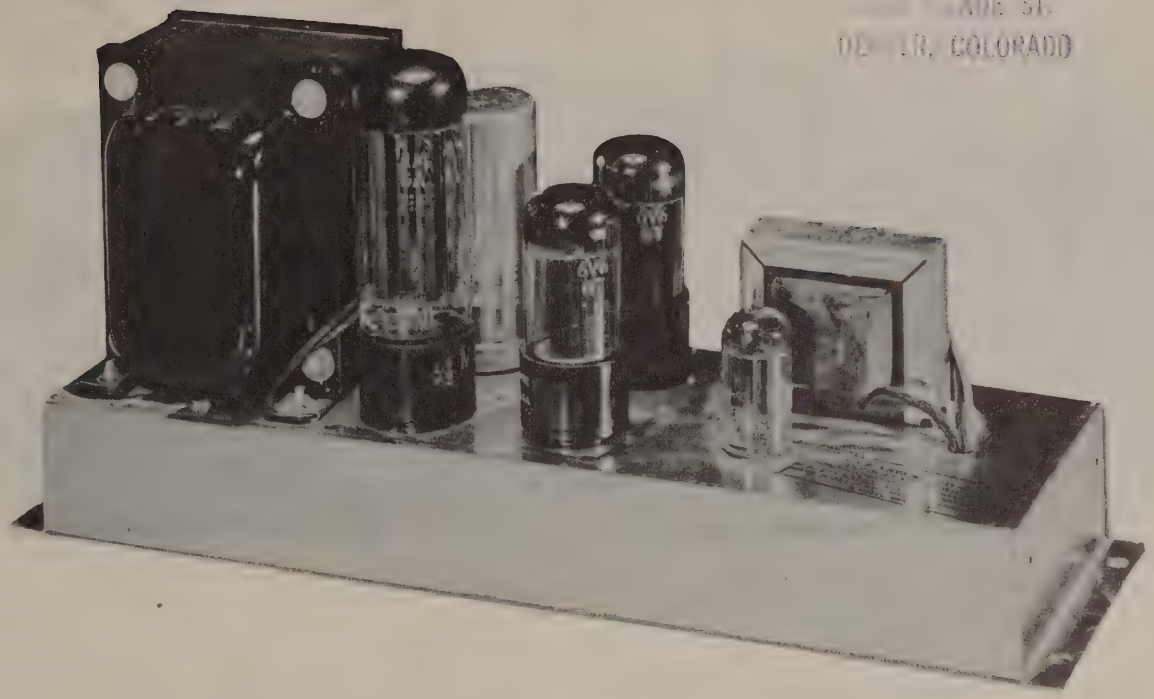


FIG. 5

PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

OF
NSHIP
TRADE ST.
DENVER, COLORADO

MAGNAVOX
CHASSIS AMP-139AA



MAGNAVOX
CHASSIS AMP-139AA

TRADE NAME	Magnavox Chassis AMP-139AA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne, Ind.
TYPE SET	AC Operated 10 Watt Audio Amplifier
TUBES (Four)	Types 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 5U4GA Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .9 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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OF
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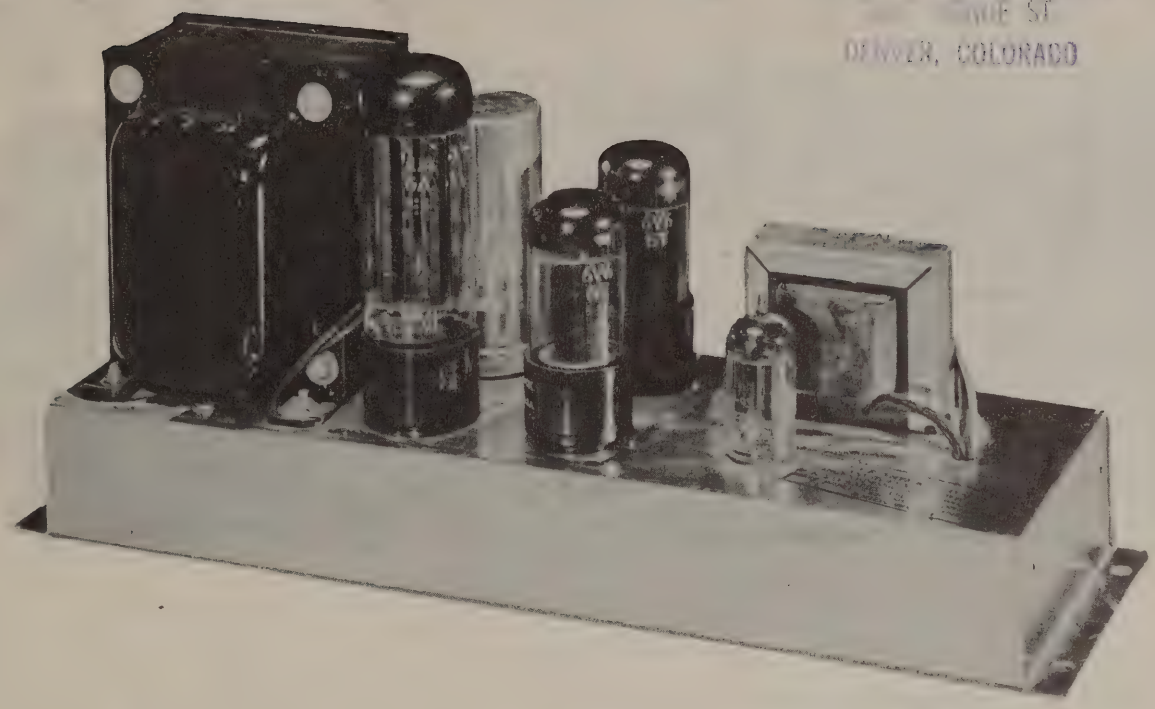
MAGNAVOX
CHASSIS AMP-139AA



MAGNAVOX
CHASSIS AMP-139AA

TRADE NAME	Magnavox Chassis AMP-139AA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne, Ind.
TYPE SET	AC Operated 10 Watt Audio Amplifier
TUBES (Four)	Types 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 5U4GA Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .9 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX
Chassis AMP-139AA

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT	
V1	AF Amplifier- Phase Inv.	12AX7	12AX7	
V2	Output	6V6GT	6V6GT	
V3	Output	6V6GT	6V6GT	
V4	Rectifier	5U4GA	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	270201-56	AFH4-78	D084	FP429	TM-4022	Q-380	TVL-4734
B	■30	450							
C	▲10	450							
D	20	25							
C2	20	25	270027-2	PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	220		250207-48	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C4	.047	200	250201-11	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C5	.047	200	250201-11	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C6	.001	600	250201-1	SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C7	10000		250219-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R1	47KΩ	1/2	230104-82	BTS-47K	
R2	470KΩ	1/2	230104-94	BTS-470K	
R3	470KΩ	1/2	230104-94	BTS-470K	
R4	3300Ω	1/2	230104-68	BTS-3300	
R5	220Ω	1/2	230104-54	BTS-220	
R6	15KΩ	1/2	230104-76	BTS-15K	
R7	470KΩ	1/2	230104-94	BTS-470K	
R8	6800Ω	1/2	230104-72	BTS-6800	

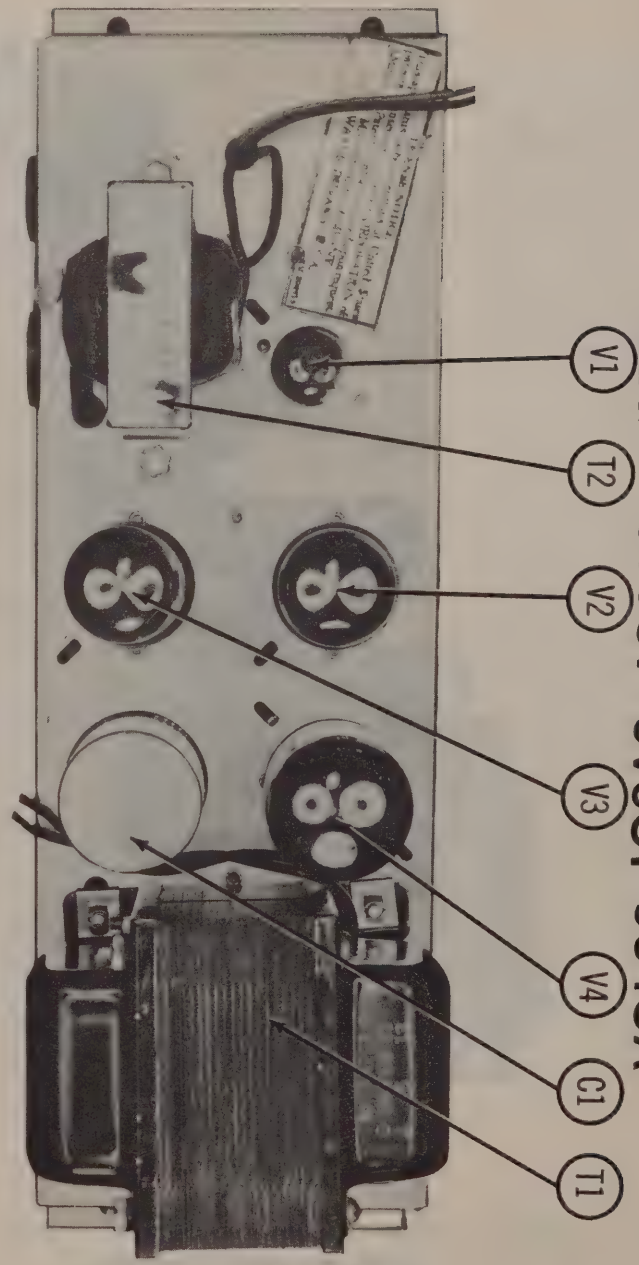
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R9	100KΩ	1/2	230104-86	BTS-100K	
R10	220KΩ	1/2	230104-90	BTS-220K	
R11	220KΩ	1/2	230104-90	BTS-220K	
R12	270Ω	2	230096-55	BTB-270	
R13	2700Ω	1/2	230104-67	BTS-2700	
R14	100Ω	1/2	230104-50	BTS-100	
R15	100Ω	1/2	230104-50	BTS-100	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ②.9A	576VCT .124ADC	5VAC ② 3A	6.3VAC ②1.5A①	D300080-G1 300080-1 ②	P9312 ④		PC8405⑤	22R05 ③	

① Current will increase when tuner is used.
② Alternate power transformer.
③ Use Universal mounting bracket.
④ Tape 6.3V center tap.
⑤ Drill new mounting holes.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.9KΩ CT	3-4Ω	C330038-1A	Z1011	A-2935	A-3870	22S58	S-55X	

FILTER CHOKE

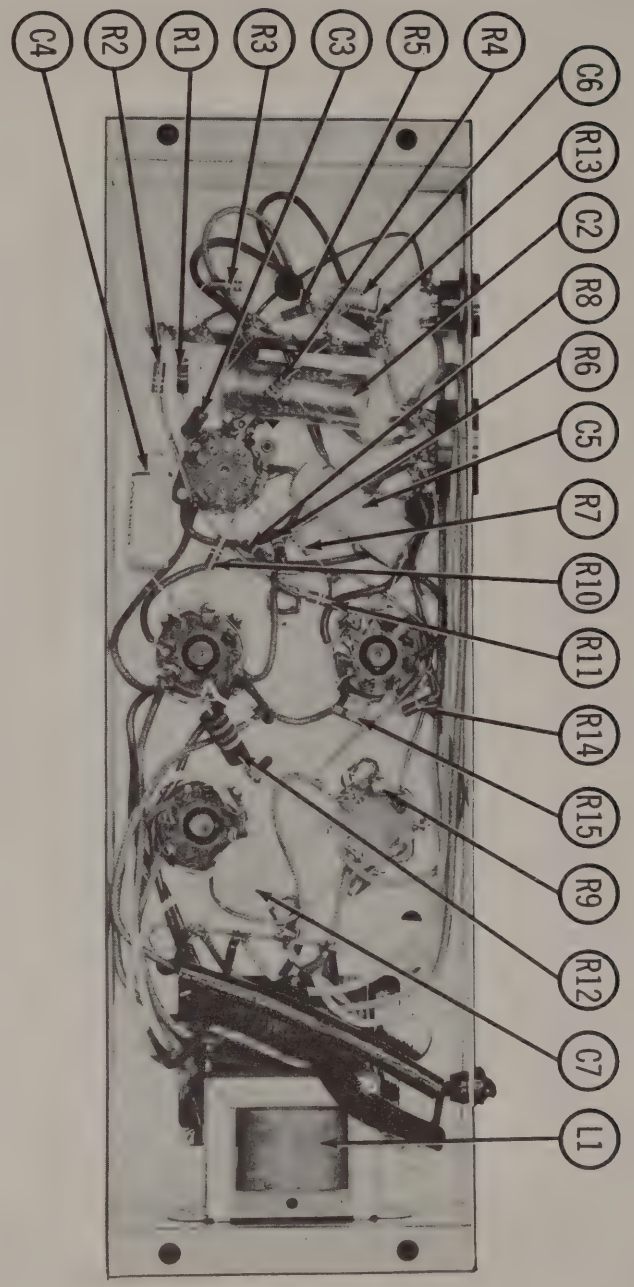
ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.057ADC	53Ω	1.27 HY	320041-2			C-2326	26C41	

MISCELLANEOUS

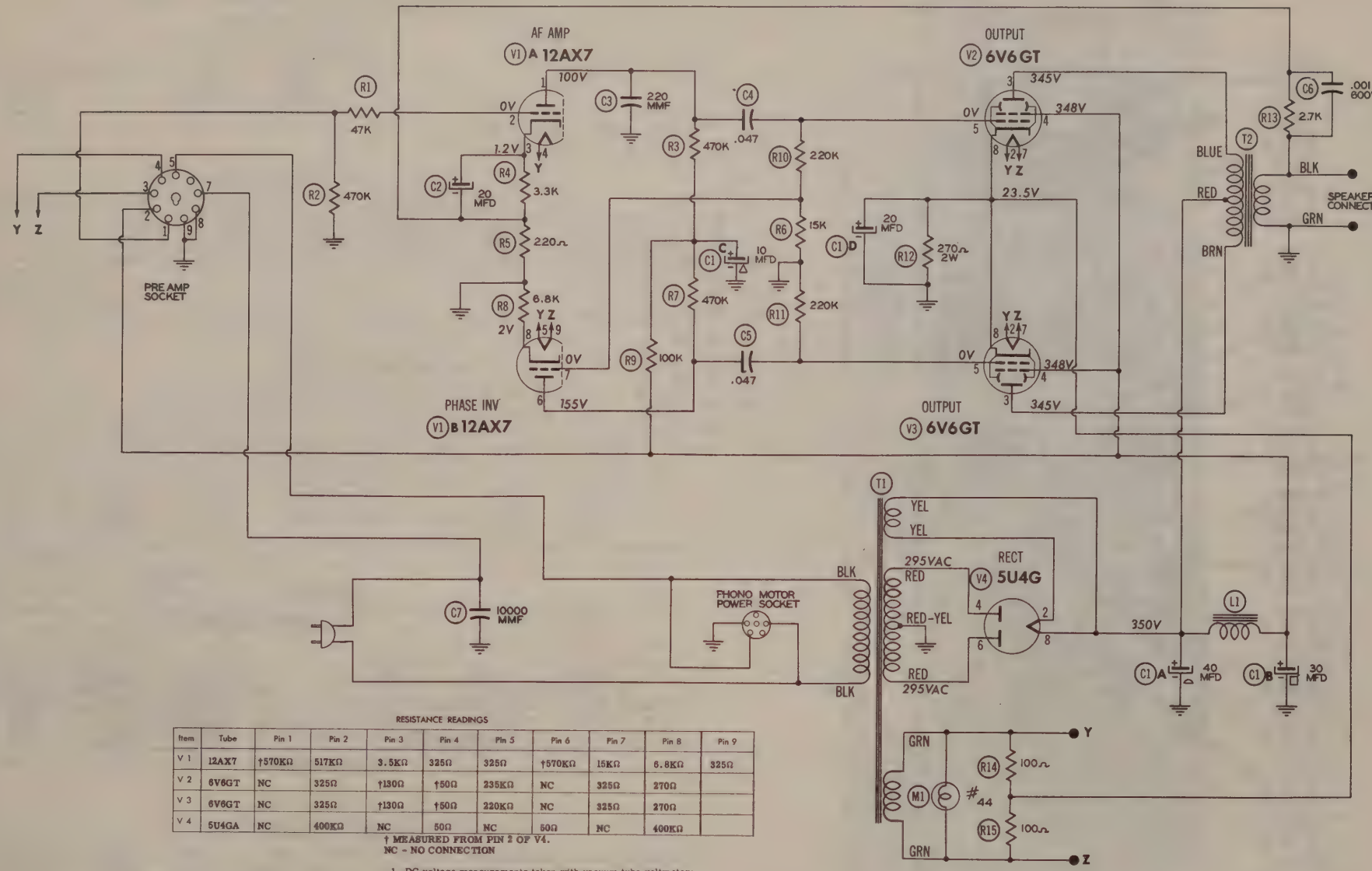
ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M1	Pilot Light		#44

PROPERTY OF
L. F. [illegible]
3924 MEADE ST
DENVER, COLORADO

CHASSIS—BOTTOM VIEW



MAGNAVOX
Chassis AMP-139AA



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†570KΩ	517KΩ	3.5KΩ	325Ω	325Ω	†570KΩ	15KΩ	6.8KΩ	325Ω
V 2	6V6GT	NC	325Ω	†130Ω	†50Ω	235KΩ	NC	325Ω	270Ω	
V 3	6V6GT	NC	325Ω	†130Ω	†50Ω	220KΩ	NC	325Ω	270Ω	
V 4	5U4GA	NC	400KΩ	NC	50Ω	NC	50Ω	NC	400KΩ	

† MEASURED FROM PIN 2 OF V4.
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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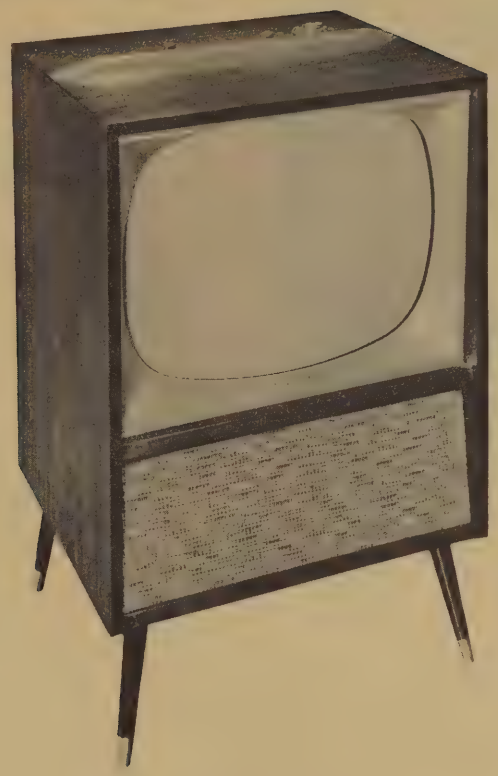
MAGNAVOX CHASSIS CMUA475AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA475AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA ("600" Series)



MAGNAVOX CHASSIS CTA475AA

TRADE NAME	Magnavox	CHASSIS CMUA475AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA475AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA ..... "600" Series
MANUFACTURER	Magnavox, Co., 2131 Bueter Road, Fort Wayne 4, Indiana	
TYPE SET	Television Receiver	
TUBES	Twenty	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.6 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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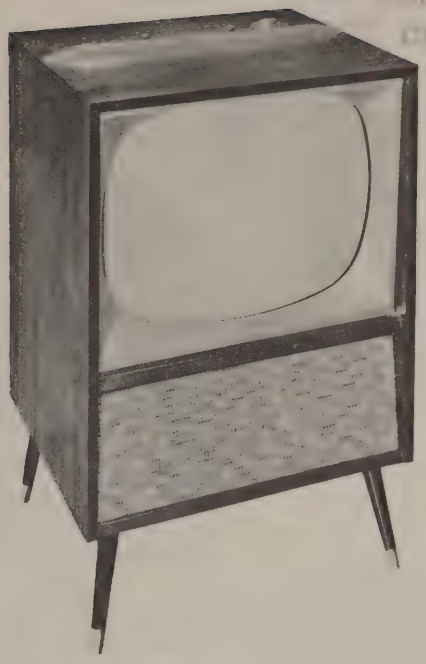

MODELS

CMUA475AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA475AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA .....''600'Series

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type control knobs from top panel of cabinet.

2. Remove 7 wood screws and 1 metal screw. Remove rear cover.

3. Disconnect speaker leads.

4. Remove 3 bolts holding rear braces (1 at top of chassis and 1 on each side of cabinet.)

5. Remove 6 chassis mounting board bolts. (NOTE: hold mounting board in place when removing mounting bolts). Let mounting board drop in to guide and slide out.

6. Remove 4 speaker nuts. Remove speaker.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (L31) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the discriminator secondary (L30) located on tube side of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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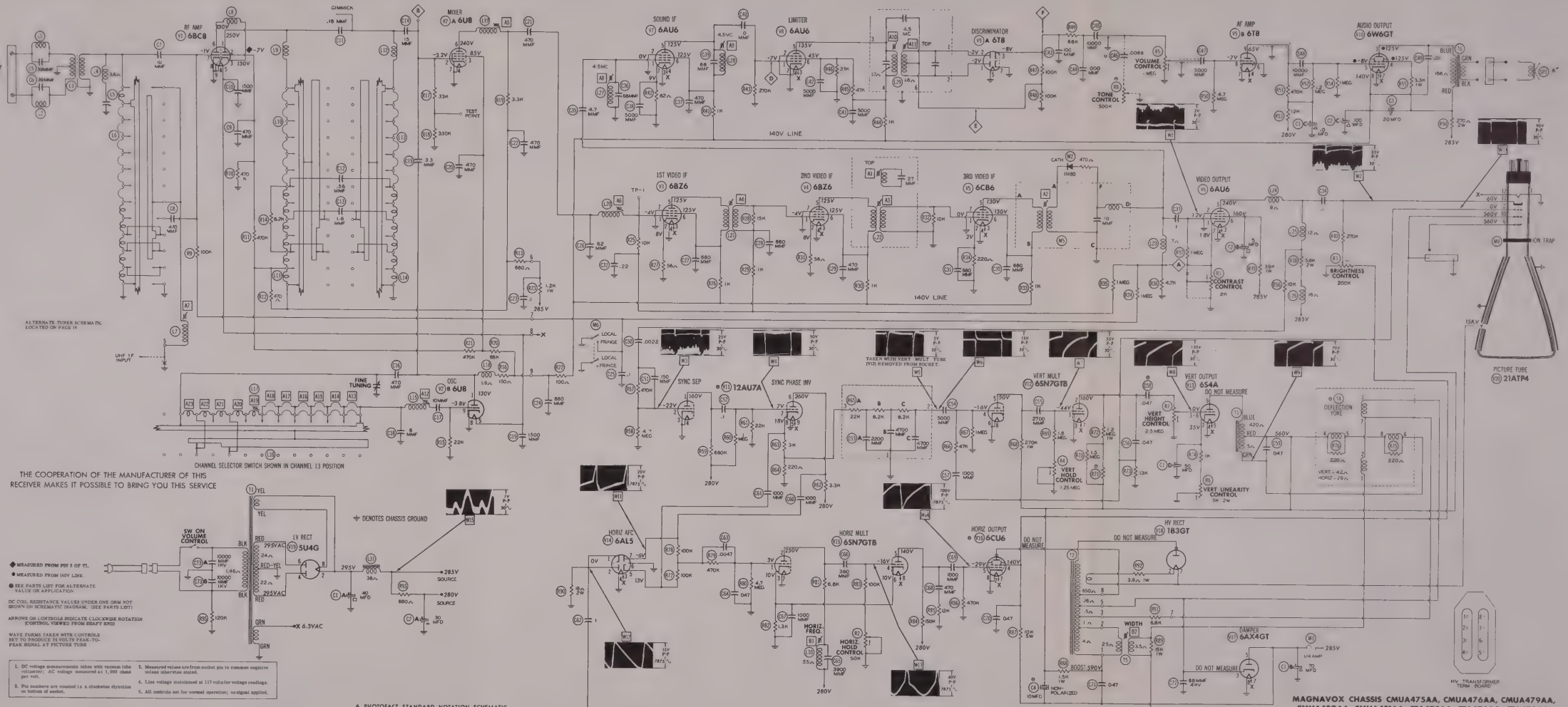
MAGNAVOX CHASSIS CMUA475AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA475AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA ("600" Series)
RF AMP 6BC8
MIXER 6U8
OSC 6U8
SOUND IF 6AU6
LIMITER 6AU6
DISCRIMINATOR 6AT8
AF AMP 6T8
AUDIO OUTPUT 6W6GT
1ST VIDEO IF 6BZ6
2ND VIDEO IF 6BZ6
3RD VIDEO IF 6CB6
VIDEO OUTPUT 6AU6
SYNC SEP 12AU7A
SYNC PHASE INV
VERT MULT 6SN7GTB
VERT OUTPUT 6S4A
HORIZ AFC 6AL5
HORIZ MULT 6SN7GTB
HORIZ OUTPUT 6CU6
HV RECT 1B3GT
DAMPER 6AX4GT
LV RECT 5U4G
PICTURE TUBE 21ATP4
VOLUME CONTROL
TONE CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
VERT HEIGHT CONTROL
VERT LINEARITY CONTROL
VERT HOLD CONTROL
HORIZ FREQ
HORIZ HOLD CONTROL
WIDTH
ION TRAP
DEFLECTION YOKE
SW ON VOLUME CONTROL
FINE TUNING
TEST POINT
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 14
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DENOTES CHASSIS GROUND
140V LINE
285V SOURCE
280V SOURCE
6.3VAC
295VAC
MEASURED FROM PIN 5 OF V1.
MEASURED FROM 140V LINE.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 35 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
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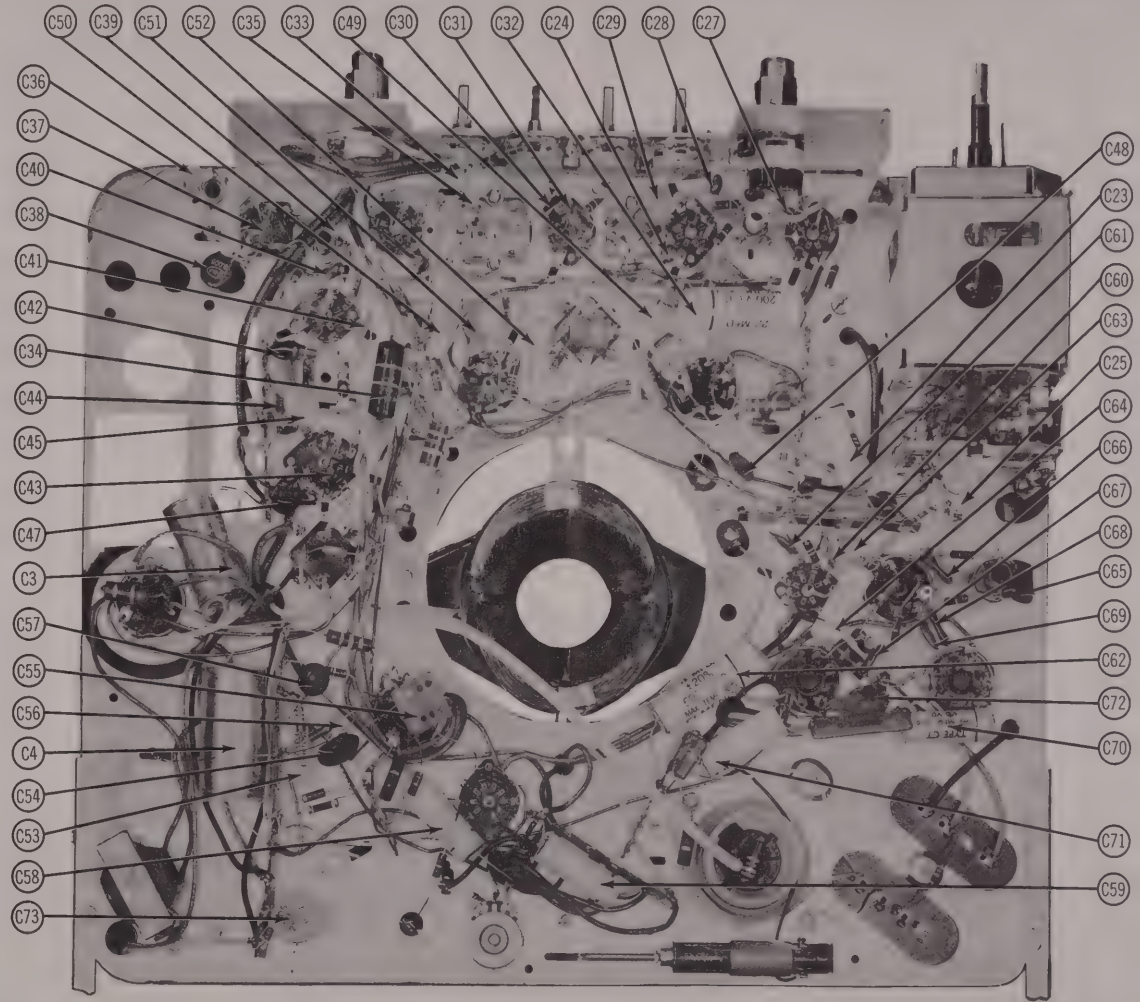
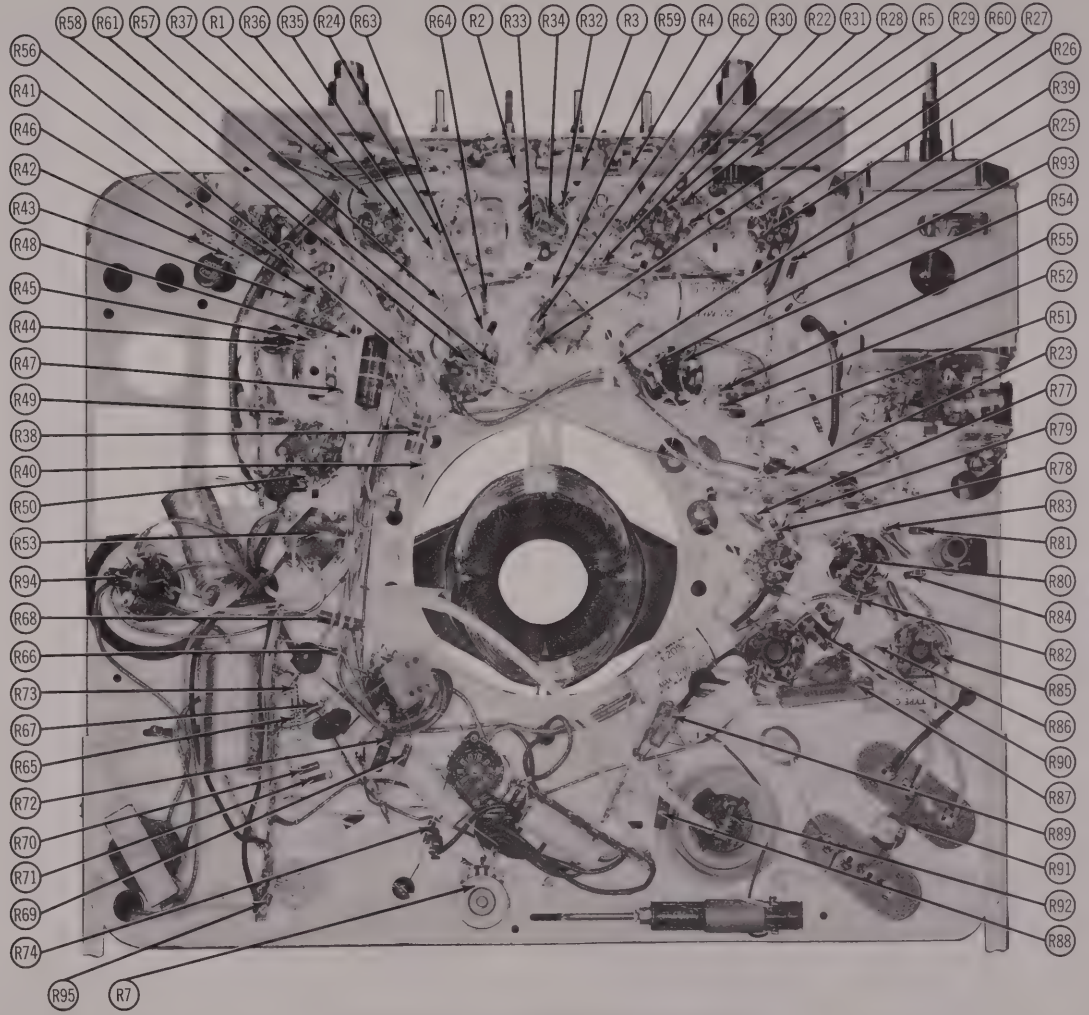


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

MAGNAVOX CHASSIS CMUA473AA, CMUA476AA, CMUA479AA, CMUA504AA, CMUA481AA, CTA473AA, CTA476AA, CTA479AA, CTA490AA, CTA481AA (1400 Series)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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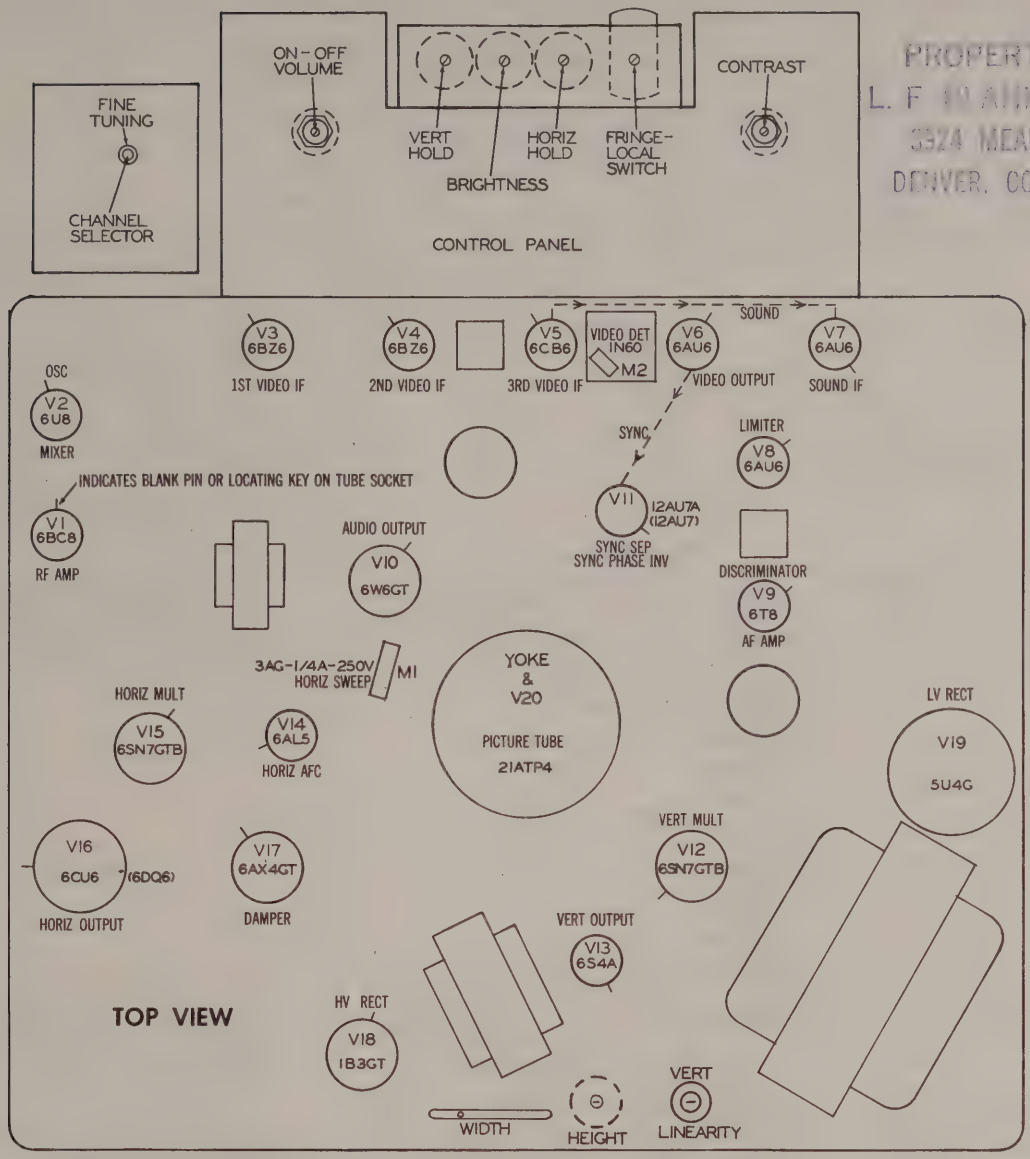
MAGNAVOX CHASSIS CMUA473AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA472AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA (1600 Series)

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V10**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V20**
Has pic, no sound - **V7, V8, V9, V10**

SYNC FAILURE
No vert. sync - **V11, V12**
No horiz. sync - **V11, V14, V15**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20, Fuse (M1)**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V11, V12**
Horiz. off freq. - **V11, V14, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal multivibrator tube (V15) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C25. Connect the positive lead to chassis.
Connect the negative lead of a 3 volt battery to the ungrounded side of C32. Connect the positive lead to chassis . If available single tapped 4.5 volt battery may be used.
In step 1 it is possible to obtain two settings of A1 at which maximum attenuation will occur. Correct adjustment will be obtained when 47.25MC marker is centered in the trap and the core is farthest out of the coil.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6BZ6 (V3). Low side to chassis.	43.0MC (10MC Swp)	47.25MC	Any unused high band channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1	Couple a second generator to point Ⓑ to provide markers. Adjust to center 47.25MC marker in trap notch as in Fig. 1. Use enough sweep output so that the trap notch is visible on the scope.
2.	"	"	"	42.75MC 45.0MC 45.75MC 47.25MC	"	"	A2, A3, A4	Attenuate sweep generator output for 2 volt peak to peak on scope. Adjust for response similar to Fig. 1. Adjust A2 for maximum gain and MINIMUM tilt. A3 positions 45.75 MC marker. Recheck A1 adjustment for correct 47.25MC position. See Fig. 1.
3.	"	High side to point Ⓑ. Low side to chassis.	"	"	"	"	A5, A6	Adjust A5 for maximum gain and to place 45.75MC marker at 50% on response curve as in Fig. 2. Adjust A6 for maximum amplitude and correct tilt. Repeat adjustments of A5 and A6 (if necessary) several times to obtain response within limits in Fig. 2.
4.	Fig. 3	Thru matching network (Fig. 3) to VHF antenna terminals.	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	"	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Couple marker generator loosely to pin 1 (grid) of 6BZ6 (V3). Check for response similar to Fig. 2 on all VHF channels. Response should be within limits shown by dotted lines. If necessary, repeat steps 1 thru 4.
5.	1000Ω Carbon Resistor	High side to point Ⓒ. thru 1KΩ. Low side to chassis.	43MC (10MC Swp)	45.75MC	UHF	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A7	Turn tuner to UHF position. Adjust A7 to place 45.75MC marker at 50% on high frequency slope of response curve. (Fig. 2.).

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.005MFD	High side to the junction of C35 and L24. Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe thru 10KΩ to point Ⓔ. Common to chassis.	A8, A9, A10	Adjust for maximum output. Keep input signal at lowest point possible for an accurate indication.
7.	"	"	"	"	DC probe thru 10KΩ to point Ⓕ. Common to chassis.	All	Adjust for MINIMUM deflection. A positive and a negative reading will be obtained on either side of the correct setting.

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Loosely couple an RF signal generator to the grid of the first video IF amplifier tube (V3) and tune it accureately to 45.75MC.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 3	Thru matching network (Fig. 3) to antenna terminals.	213MC (10MC Swp)	211.25MC 45.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust so that video RF and video IF markers coincide on response curve.
9.	"	"	207MC (10MC Swp)	205.25MC 45.75MC	12	"	A13	Adjust position of loops so that video RF and video IF markers coincide on response curve.
			201MC (10MC Swp)	199.25MC 45.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 45.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 45.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 45.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 45.75MC	7		A18	
10.	"	"	85MC (10MC Swp)	83.25MC 45.75MC	6	"	A19	Adjust so that video RF and video IF marker coincide on response curve.
11.	"	"	79MC (10MC Swp)	77.25MC 45.75MC	5	"	A20	Adjust (compress or expand coil turns) so that video RF and video IF markers coincide on response curve.
			69MC (10MC Swp)	67.25MC 45.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 45.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 45.75MC	2		A23	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable.
Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

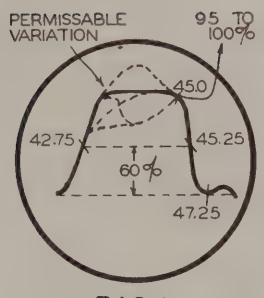

FIG.1

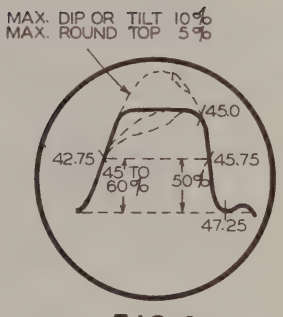

FIG. 2

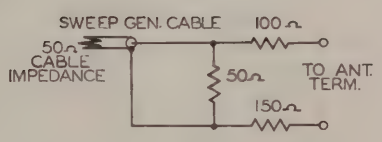

FIG. 3

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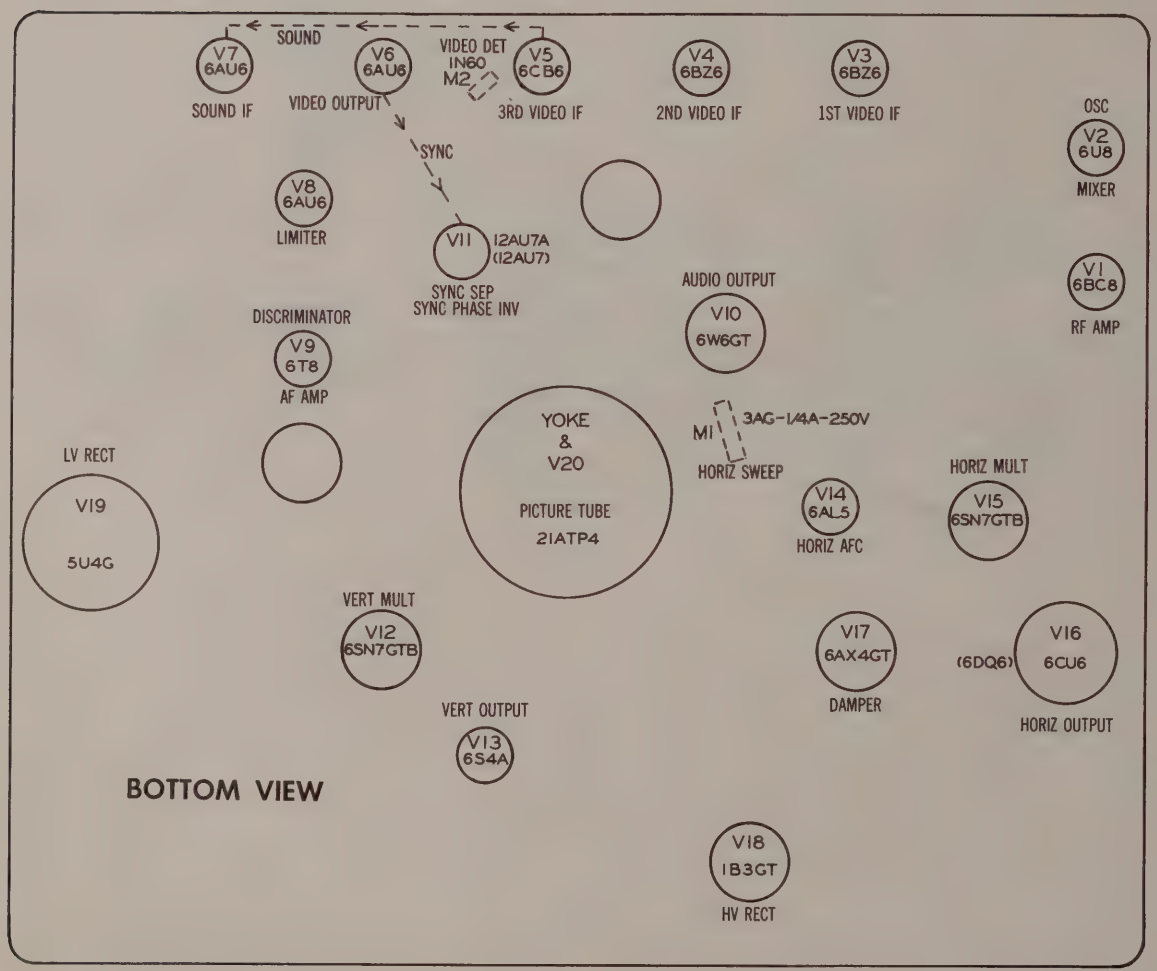
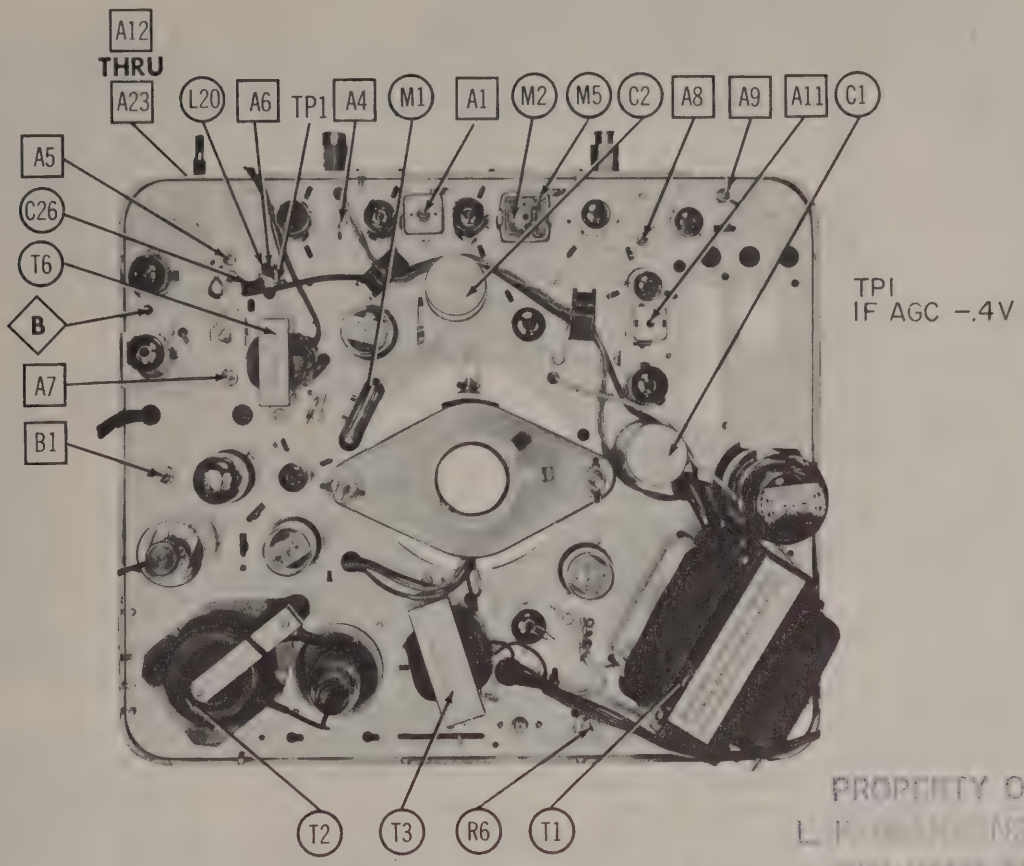
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC8	† 1.9KΩ	250KΩ	INF	0Ω	.1Ω	INF	1Meg	0Ω	0Ω
V 2	6U8	■ 250Ω	360KΩ	■ 55KΩ	0Ω	.1Ω	† 5.2KΩ	0Ω	0Ω	22KΩ
V 3	6BZ6	1Meg	56Ω	.1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 4	6BZ6	1Meg	56Ω	.1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 5	6CB6	.1Ω	220Ω	.1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 6	6AU6	1Meg	0Ω	.1Ω	0Ω	† 5.6KΩ	† 39KΩ	140Ω		
V 7	6AU6	.5Ω	0Ω	0Ω	.1Ω	■ 1KΩ	■ 1KΩ	82Ω		
V 8	6AU6	270KΩ	0Ω	.1Ω	0Ω	■ 1KΩ	■ 40KΩ	0Ω		
V 9	6T8	100KΩ	100KΩ	200KΩ	.1Ω	0Ω	0Ω	0Ω	4.7Meg	† 470KΩ
V 10	6W6GT	TP	0Ω	† 460Ω	† 3.6KΩ	550KΩ	TP	.1Ω	60KΩ	
V 11	12AU7A	† 680KΩ	4.7Meg	0Ω	0Ω	0Ω	† 4KΩ	22KΩ	3.2KΩ	.1Ω
V 12	6SN7GTB	2Meg	▲ 1.6Meg	0Ω	1Meg	▲ 270KΩ	0Ω	.1Ω	0Ω	
V 13	6S4A	NC	2.2KΩ	1.3Meg	0Ω	.1Ω	1.3Meg	NC	NC	▲ 3KΩ
V 14	6AL5	18Ω	18Ω	.1Ω	0Ω	5Meg	0Ω	5Meg		
V 15	6SN7GTB	4.7Meg	† 7.5KΩ	1.3KΩ	120KΩ	† 150KΩ	1.3KΩ	0Ω	.1Ω	
V 16	6CU6	NC	0Ω	NC	† 10KΩ	470KΩ	TP	.1Ω	0Ω	TOP CAP ▲ 26Ω
V 17	6AX4GT	NC	NC	20Meg	NC	† 38Ω	NC	.1Ω	0Ω	
V 18	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 676Ω
V 19	5U4G	NC	60KΩ	TP	22Ω	NC	24Ω	TP	60KΩ	
V 20	21ATP4	0Ω	13KΩ	PIN 6 ▲ 1.5KΩ	PIN 10 ▲ 1.5KΩ	PIN 11 † 350KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 2 OF V19.
■ MEASURED FROM 140V LINE.
▲ MEASURED FROM PIN 3 OF V17.
TP-TIE POINT
NC-NO CONNECTION



TUBE PLACEMENT CHART



CHASSIS TOP VIEW

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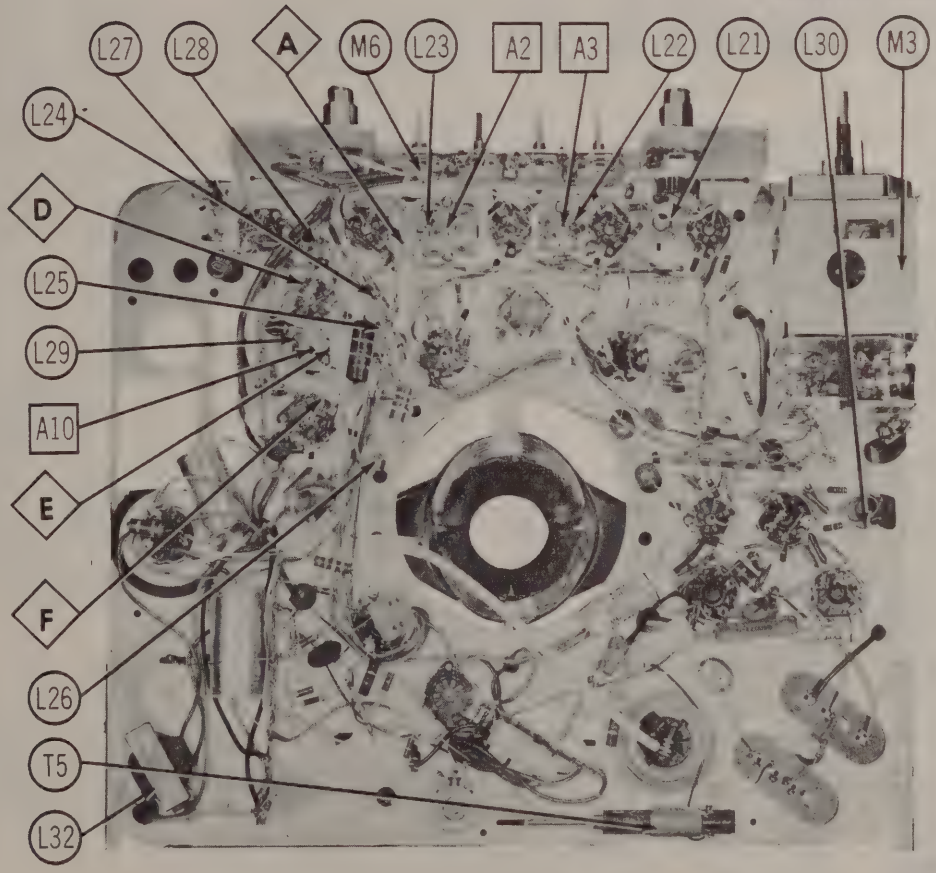
L. P. GRAHAM
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BC8	6BC8	
V2	Osc. -Mixer	6U8	6U8	
V3	1st Video IF Amp.	6BZ6	6BZ6	
V4	2nd Video IF Amp.	6BZ6	6BZ6	
V5	3rd Video IF Amp.	6CB6	6CB6	
V6	Video Output	6AU6	6AU6	
V7	Sound IF Amp.	6AU6	6AU6	
V8	Limiter	6AU6	6AU6	
V9	Discriminator-AF Amp.	6T8	6T8	
V10	Audio Output	6W6GT	6W6GT	
V11	Sync Sep. -Sync Phase Inv.	12AU7A	12AU7A	12AU7 may be used as an alternate.
V12	Vert. Mult.	6SN7GTB	6SN7GTB	
V13	Vert. Output	6S4A	6S4A	
V14	Horiz. AFC	6AL5	6AL5	
V15	Horiz. Mult.	6SN7GTB	6SN7GTB	
V16	Horiz. Output	6CU6	6CU6	6DQ6 may be used as an alternate.
V17	Damper	6AX4GT	6AX4GT	
V18	H. V. Rect.	1B3GT	1B3GT	
V19	LV Rect.	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MAGNAVOX PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21ATP4 ①	21ATP4 ①	21ATP4 ①	21ATP4/ ① 21ATP4A ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■40	350	270021-52		D045	FP385.5	TM-804020-450	T-110	TVL-3792
B	▲70	350			BR4035	TC39	TD-50-50	MT-0550	TVA-1308
C	▲10	350							
D	50	50							
C2A	▲30	350	270021-55	AFH4-88-60		FP385		T-735	TVL-3762
B	■5	350							
C	▲100	200							
C3	20	350	270027-20	PRS450V20	BR2035	TC65	TD-20-350	FM-4520	TVA-1608
C4	10	350	270027-26 (Note 1)			TC65 * TC65	TD-10-350NP	FM-4520 * FM-4520	

Note 1. C4 is a non-polarized unit.
* Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	39			SI39	DD-390	G031	831-390	UC-5439	5GA-Q39	
C6	39			SI39	DD-390	G031	831-390	UC-5439	5GA-Q39	
C7	10			SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C8	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C9	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C10	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C11	.18									
C12	.56									
C13	1.8									
C14	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C15	3.3			NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C16	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C17	10			N750-SI10	TCN-10	TN01	N750A-100	NT-541	5TCU-Q1	
C18	6									
C19	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C20	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C21	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C22	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C23	.1	400	250211-13	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C24	680		250218-4	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C25	.1	400	250202-13	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C26	82		250226-328		TCZ-82	TZ28	NP0-337-820			
C27	680		250218-10	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C28	680		250218-4	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C29	470		250218-15	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C30	680		250218-4	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C31	680		250218-4	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C32	.22	200	250202-15	P288N-22		CUB2P22		PT4022	2TM-P22	
C33	.1	200	250185-16	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C34	.1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C35	4.7		250221-122	NP0-SI4.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCCB-V47	
C36	68		250218-7	NP0-SI68	TCZ-68	Z038	NP0-337-680		5TCC-Q68	
C37	470		250218-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C38	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C39	68		250218-7	N750-SI68	TCN-68	N038	N750L-680		5TCU-Q68	
C40	10		250207-3	SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C41	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C42	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C43	100		250207-46	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C44	1000		250218-8	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C45	10000		250175-6	DI-01	DD-1032	K082	811-01	DC-511	5HK-S1	
C46	.0068	400	250211-6	SI6800	D6-682	CUB6D68	811-0068		6TM-D68	Note 2
C47	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	10000		250175-6	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	.01	600	250201-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C50	.0022	400	250211-3	SI2200	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C51	150		250229-534	SI150	D6-151	TP36	GP2K-151	UC-5315	5GA-T15	
C52	.1	400	250211-13	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C53A	2200							PT6222		
B	4700		♦250186-1	♦PA-110	♦PC-100	♦115TM1	♦1405-01	PT6247	♦V-1	
C	4700							PT6247		
C54	5000		250218-13	1464-005		1R5D5		MCB465	MS-25	
C55	2700	500	250160-1048	1464-0027		1R5D27		MCE461	MS-227	
C56	.047	400	250212-7							
C57	1000		250218-8	1464-001		1R5D1	811-102	MCB251	MS-21	
C58	.047	400	250211-11	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	Note 3
C59	.047	400	250211-11	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C60	1000		250218-8	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C61	1000		250218-8	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C62	.1	600	250201-13	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

PARTS LIST AN

CAPACI

ITEM No.	RATING: CAP.	RATING: VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.
C63	.0047	400	250212-4	1464-0047	
C64	.047	200	250212-5	BPD-05	DF-503
C65	3900		250229-468	1464-0039	
C66	360		250229-343	1469-00036	
C67	1000		250218-8	BPD-001	DD-102
C68	470		250229-346	1469-00047	
C69	1000		250218-8	BPD-001	DD-102
C70	.047	400	250211-11	BPD-05	DF-503
C71	.047	400	250211-11	BPD-05	DF-503
C72	68	4000	250175-23	HVD-60-68	DD60-680
C73A	10000	1000	250219-3		DD-103
B	10000	1000			DD-103

Note 2. Not used in some versions.
Note 3. Some versions use .1MFD in this application (part #25
♦ Items C53A, C53B, C53C, R65A, R65B and R65C are combi

CONT

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT: MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTA PART No
R1A	2000Ω	½	220126-45	AB-705	
B	Shaft		Not Req.	AK-3	
R2A	50KΩ	½	220129-7	AB-31	A47-50K-3
B	Shaft		Not Req.	AK-8	FS-3
R3A	200K	½	220129-11	AB-46	A47-200K
B	Shaft		Not Req.	AK-8	FS-3
R4A	1.25Meg	½	220129-9	AB-742	A47-1.5Me
B	Shaft		Not Req.	AK-8	FS-3
R5A	1Meg	½	220126-46	AB-70	A47-1Meg
B	Shaft		Not Req.	AK-3	FS-3
C	Switch		Not Req.	KB-1	SWE-12
R6	3000Ω	2	220120-3		39-3000
R7A	2.5Meg	½	220146-2	AB-83	A47-2.5Me
B	Shaft		Not Req.	AK-1	FKS-1/4
R8	500KΩ	½	220126-48		

Note 1. Used in chassis CTA476AA and CMUA476AA only.

RESIST

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R9	100KΩ	½	230104-86	BTS-100K	
R10	470KΩ	½	230104-94	BTS-470K	
R11	470KΩ	½	230104-94	BTS-470K	
R12	470Ω	½		BTS-470	
R13	680Ω	½	230104-60	BTS-680	
R14	8200Ω	½	230104-73		
R15	22KΩ	½	230104-78		
R16	150Ω	½	230104-52	BTS-150	
R17	33KΩ	½	230104-80	BTS-33K	
R18	330KΩ	½	230104-92		
R19	3300Ω	½	230104-68		
R20	68KΩ	½	230104-84		
R21	470KΩ	½	230104-94		
R22	100Ω	½	230104-50	BTS-100	
R23	1200Ω	1	230145-63	BTA-1200	
R24	1Meg	½	230104-98	BTS-1Meg	
R25	10KΩ 5%	½	230094-183		
R26	1000Ω	½	230104-62	BTS-1000	
R27	56Ω	½	230104-47	BTS-56	
R28	15KΩ 5%	½	230094-187		
R29	1000Ω	½	230104-62	BTS-1000	
R30	1000Ω	½	230104-62	BTS-1000	
R31	56Ω	½	230104-47	BTS-56	
R32	10KΩ 5%	½	230094-183		
R33	1000Ω	½	230104-62	BTS-1000	
R34	220Ω	½	230104-54	BTS-220	
R35	1Meg	½	230104-98	BTS-1Meg	
R36	4700Ω 5%	½	230094-175	BTS-4700 5%	
R37	1Meg	½	230104-98	BTS-1Meg	
R38	5600Ω	2	230106-71	BTB-5600	
R39	39KΩ	1	230105-81	BTA-39K	
R40	270KΩ	½	230104-91	BTS-270K	
R41	1000Ω	½	230104-62	BTS-1000	
R42	82Ω	½	230104-49	BTS-82	
R43	270KΩ	½	230104-91	BTS-270K	
R44	1000Ω	½	230104-62	BTS-1000	
R45	47KΩ	½	230104-82	BTS-47K	
R46	33KΩ	½	230104-80	BTS-33K	
R47	100KΩ	½	230104-86	BTS-100K	
R48	100KΩ	½	230104-86	BTS-100K	
R49	68KΩ	½	230104-84	BTS-68K	
R50	4.7Meg	½	230104-106	BTS-4.7Meg	
R51	470KΩ	½	230104-94	BTS-470K	
R52	1.2Meg 5%	½	230094-233	BTS-1.2Meg 5%	
R53	12KΩ	½	230104-75	BTS-12K	

Note 1. Negative temperature co
♦ R65A, R65B, R65C, C53A, C5

TRANSFORM

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.
T1	117VAC Ⓐ	575VCT	5V Ⓐ	6.3V Ⓐ	300077-1
	1.6A	.220ADC	3A	9.5A	

① Parallel & phase 6.3V, 5A windings tape 6.3V, 1.2A windin

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BC8	6BC8	
V2	Osc.-Mixer	6U8	6U8	
V3	1st Video IF Amp.	6BZ6	6BZ6	
V4	2nd Video IF Amp.	6BZ6	6BZ6	
V5	3rd Video IF Amp.	6CB6	6CB6	
V6	Video Output	6AU6	6AU6	
V7	Sound IF Amp.	6AU6	6AU6	
V8	Limiter	6AU6	6AU6	
V9	Discriminator-AF Amp.	6T8	6T8	
V10	Audio Output	6W6GT	6W6GT	
V11	Sync Sep.-Sync Phase Inv.	12AU7A	12AU7A	12AU7 may be used as an alternate.
V12	Vert. Mult.	6SN7GTB	6SN7GTB	
V13	Vert. Output	6S4A	6S4A	
V14	Horiz. AFC	6AL5	6AL5	
V15	Horiz. Mult.	6SN7GTB	6SN7GTB	
V16	Horiz. Output	6CU6	6CU6	6DQ6 may be used as an alternate.
V17	Damper	6AX4GT	6AX4GT	
V18	H. V. Rect.	1B3GT	1B3GT	
V19	LV Rect.	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MAGNAVOX PART No.	CBS PART No	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21ATP4 ①	21ATP4 ①	21ATP4 ①	21ATP4/ ① Aluminized 21ATP4A ② Silver Screen "85"	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.	NOTES
C1A	m40	350	270021-53		0045	FP388.5	TM-804020-450	C-110	TVL-3723	
B	m70	350			BR4035	TC39	TD-50-80	MT-0550	TVA-1308	
C	±10	350								
D	50	50								
C2A	±30	350	270021-55	AF34-88-80		FP388		T-725	TVL-3762	
B	m5	350								
C	±100	300								
C3	20	350	270027-30	PRH450V20	BR2035	TC65	TD-20-350	FM-4520	TVA-1608	
C4	10	350	270027-26 (Note 1)			TC65 * TC65	TD-10-350MP	FM-4520 * FM-4520 *		

Note 1. C4 is a non-polarized unit.
* Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	39		SI39	DD-390	G021	S31-390	UC-5439	SCA-G39		
C6	39		SI39	DD-390	G021	S31-390	UC-5439	SCA-G39		
C7	10		SI10	D6-100	TP09	GPIK-100	UC-541	SCA-Q1		
C8	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C9	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C10	1500		BPD-0015	DD-153	K071	S01-0015	UC-5215	5SK-D15		
C11	15									
C12	.56									
C13	1.5									
C14	15		SI15	D6-150	TP11	GPIK-150	UC-5415	SCA-Q15		
C15	3.3		NPO-SI3.3	TC2-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33		
C16	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C17	10		N750-SI10	TCN-10	TN01	N750A-100	NT-541	5TCU-Q1		
C18	6									
C19	1500		BPD-0015	DD-153	K071	S01-0015	UC-5215	5SK-D15		
C20	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C21	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C22	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C23	.1	400	250212-13	P488N-1		CUB4P1		P7401	47M-P1	
C24	680		250218-4	BPD-00068	DD-681	K065	S11-681	UC-5368	SCA-T68	
C25	.1	600	250202-13	P488N-1	DF-104	CUB4P1		P7401	47M-P1	
C26	33		250238-33		TC2-330	TZ05	NP0-337-S3G			
C27	680		250218-10	BPD-00068	DD-681	K065	S11-681	UC-5368	SCA-T68	
C28	680		250218-4	BPD-00068	DD-681	K065	S11-681	UC-5368	SCA-T68	
C29	470		BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47		
C30	680		250218-4	BPD-00068	DD-681	K065	S11-681	UC-5368	SCA-T68	
C31	680		250218-4	BPD-00068	DD-681	K065	S11-681	UC-5368	SCA-T68	
C32	.22	300	250202-15	P288N-22		CUB2P23		P74022	27M-P22	
C33	.1	300	250185-18	P288N-1	DF-104	CUB2P1		P7401	27M-P1	
C34	.1	300	250202-13	P288N-1	DF-104	CUB2P1		P7401	27M-P1	
C35	4.7		250221-122	NP0-S14.7	TCZ-4R7	TZ07	NP0A-4R7	Z7-5547	5TCCB-V47	
C36	68		250218-7	NP0-SI68	TCN-68	SI68	NP0-337-S6G		5TCC-Q68	
C37	470		250218-6	BPD-00047	DD-471	K060	S31-471	UC-5247	SCA-T47	
C38	5000		250175-3	BPD-005	DD-502	K080	S11-005	UC-525	5SK-D5	
C39	68		250218-6	NT0-SI68	TCN-68	SI68	NT0L-680		5TCU-Q68	
C40	10		250207-3	SI10	D6-100	TP09	GPIK-100	UC-541	SCA-Q1	
C41	5000		250175-1	BPD-005	DD-502	K080	S11-005	UC-525	5SK-D5	
C43	5000		250175-1	BPD-005	DD-502	K080	S11-005	UC-525	5SK-D5	
C43	100		250207-46	SI100	D6-101	TP34	GPIK-101	UC-531	SCA-T1	
C44	5000		250175-1	BPD-005	DD-502	K080	S11-005	UC-525	5SK-D5	
C45	10000		250175-6	DI-01	DD-1023	K083	S1D-01	UC-511	5SK-E1	
C46	.0068	400	250211-6	DH5S02	D6-682	CUB5D68	S11-0068		6TM-D68	Note 2
C47	5000		250175-1	BPD-005	DD-502	K080	S11-005	UC-525	5SK-D5	
C48	10000		250175-6	BPD-01	DD-103	K082	S1-01	UC-511	5SK-E1	
C49	.01	600	250210-7	BPD-01	D6-103	CUB3E1	GP3-333-103	P7701	6TM-D22	
C50	.0023	400	250211-3	SI2200	D6-232	CUB5D22	GP3-333-232	P75222	6TM-D22	
C51	150		250235-534	SI150	D6-151	TP36	GPIK-151	UC-5315	5CA-T15	
C52	.1	400	250211-13	P488N-1	DF-104	CUB4P1		P7401	47M-P1	
C53A	2200							P75222		
B	4700		±250188-1	±PA-110	±PC-109	±SI75M1	±1405-01	P75247	±V-1	
C	4700							P75247		
C54	5000		250218-13	1464-005		1R5D6		MC2605	MS-25	
C55	2700	500	250150-1042	1464-0027		1R5D27		MC2645	MS-227	
C56	.047	400	250212-7							
C57	1000		250218-8	1464-001		1R5D1	S1L-102	MC2E51	MS-21	
C58	.047	400	250211-11	BPD-05	DF-503	CUB4S47		P74147	47M-S47	Note 3
C59	.047	400	250211-11	BPD-05	DF-503	CUB4S47		P74147	47M-S47	
C60	1000		250218-8	BPD-001	DD-102	K069	S01-001	DC-511	5SK-D1	
C61	1000		250218-8	BPD-001	DD-102	K069	S01-001	DC-511	5SK-D1	
C62	.1	600	250201-13	P488N-1	DF-104	CUB4P1		P7701	6TM-P1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C63	.0047	400	250212-4	1464-0047				MCE463	MS-247	
C64	.047	200	250212-5	BPD-05	DF-503	CUB2S47		PT4147	47M-S47	
C65	3900		250229-465	[illegible]		CUB2S39		MCE343	MS-239	
C66	350		250229-343	1402-00036		IR5D39	91I-361		MS-239	
C67	1000		250218-8	BPD-001	DD-102	SR5T47		DC-531	5HK-D1	
C68	470		250229-346	1464-00047		K069	801-001	MCE245	MS-247	
C69	1000		250218-8	BPD-001	DD-102	SR5T47	801-001	DC-531	5HK-D1	
C70	.047	400	250211-11	BPD-05	DF-503	K069		PT4147	47M-S47	
C71	.047	400	250211-11	BPD-05	DF-503	CUB4S47		PT4147	47M-S47	
C72	68	4000	250175-23	HVD-60-68	DD60-680	CUB4P47				
C73A	10000	1000	250219-5		DD-103				10HK-B1	
B	10000	1000			DD-103				10HK-B1	

Note 2. Not used in some versions.
Note 3. Some versions use .1MFD in this application (part #250211-13).
* Items C53A, C53B, C53C, R65A, R65B and R65C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2000Ω		230126-45	AB-705		Q17-111	U-7	Contrast
B	Shaft		Not Req.	AK-3		Not Req.	TA54L	Attach to R1A
R2A	50KΩ	½	230129-7	AB-31	A47-50K-S	QU-123		Horizontal Hold
B	Shaft		Not Req.	AK-8	FS-3	VQ	Not Req.	Attach to R2A
R3A	200K	½	230129-11	AB-46	A47-200K-S	QU-129	U-43	Brightness
B	Shaft		Not Req.	AK-8	FS-3	VQ	Not Req.	Attach to R3A.
R4A	1.25Meg	½	230129-9	AB-743	A47-1.5Meg-S	QU-126	TA151.	Vertical Hold
B	Shaft		Not Req.	AK-8	FS-3	VQ	Not Req.	Attach to R4A
R5A	1Meg	½	230126-46	AB-70	A47-1Meg-2	Q13-127	U-53	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R5A
C	Switch		Not Req.	KB-1	SWR-12	76-1	U8-38	Attach to R5A
R6	3000Ω	2	220120-3		39-3000			Vertical Linearity (Wire wound)
R7A	2.5Meg	½	230146-2	AB-83	A47-2.5Meg-S	QU-239	TA255L	Vertical Height
B	Shaft		Not Req.	AK-1	FS5-1/4	RQ	Not Req.	Attach to R7A
R8	500KΩ	½	220126-48					Tone-See Note 1

Note 1. Used in chassis CTA476AA and CMUA476AA only.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R9	100KΩ	½	230104-86	BTS-100K	
R10	470KΩ	½	230104-94	BTS-470K	
R11	470KΩ	½	230104-94	BTS-470K	
R12	470Ω	½	230104-94	BTS-470	
R13	56Ω	½	230104-60	BTS-560	
R14	8200Ω	½	230104-73		
R15	22KΩ	½	230104-78		
R16	150Ω	½	230104-52	BTS-150	
R17	33KΩ	½	230104-80	BTS-33K	
R18	3300Ω	½	230104-93		
R19	3300Ω	½	230104-58		
R20	68KΩ	½	230104-84		
R21	470KΩ	½	230104-94		
R22	100Ω	½	230104-50	BTS-100	
R23	1200Ω	½	230145-53	BTS-1200	
R24	1Meg	½	230104-98	BTS-1Meg	
R25	10KΩ 5%	½	230094-183		
R26	1000Ω	½	230104-63	BTS-1000	
R27	56Ω	½	230104-47	BTS-56	
R28	15KΩ 5%	½	230094-187		
R29	1000Ω	½	230104-63	BTS-1000	
R30	1000Ω	½	230104-62	BTS-1000	
R31	56Ω	½	230104-47	BTS-56	
R32	10KΩ 5%	½	230094-183		
R33	1000Ω	½	230104-62	BTS-1000	
R34	220Ω	½	230104-54	BTS-220	
R35	1Meg	½	230104-98	BTS-1Meg	
R36	4700Ω 5%	½	230094-175	BTS-4700 5%	
R37	1Meg	½	230104-98	BTS-1Meg	
R38	5600Ω	2	230105-71	BTS-5600	
R39	33KΩ	½	230105-81	BTA-33K	
R40	270KΩ	½	230104-91	BTS-270K	
R41	100Ω	½	230104-47	BTS-56	
R42	82Ω	½	230094-49	BTS-82	
R43	270KΩ	½	230104-91	BTS-270K	
R44	3000Ω	½	230104-93	BTS-3000	
R45	47KΩ	½	230104-82	BTS-47K	
R46	33KΩ	½	230104-80	BTS-33K	
R47	100KΩ	½	230104-86	BTS-100K	
R48	100KΩ	½	230104-86	BTS-100K	
R49	68KΩ	½	230104-84	BTS-68K	
R50	4.7Meg	½	230104-106	BTS-4.7Meg	
R51	470KΩ	½	230104-94	BTS-470K	
R52	1.2Meg 5%	½	230094-233	BTS-1.2Meg 5%	
R53	12KΩ	½	230104-75	BTS-12K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R54	1Meg 5%	½	230094-231	BTS-1Meg 5%	
R55	330Ω	½	230105-59	BTA-330	
R56	10KΩ	½	230104-74	BTS-10K	
R57	470KΩ	½	230104-94	BTS-470K	
R58	4.7Meg	½	230104-106	BTS-4.7Meg	
R59	680KΩ	½	230104-96	BTS-680K	
R60	1Meg	½	230104-98	BTS-1Meg	
R61	22KΩ	½	230104-78	BTS-22K	
R62	3300Ω 5%	½	230094-171	BTS-3300 5%	
R63	3000Ω 5%	½	230094-170	BTS-3000 5%	
R64	220Ω	½	230104-54	BTS-220	
R65A	23KΩ	½		BTS-23K	
B	6800Ω	½	± 250186-1 ②	BTS-6800	
C	8200Ω	½		BTS-8200	
R66	47KΩ	½	230104-82	BTS-47K	
R67	1MΩ	½	230104-98	BTS-1Meg	
R68	270KΩ	½	230105-91	BTA-270K	
R69	1.5Meg 5%	½	230094-236	BTS-1.5Meg 5%	
R70	1.5Meg	½	230104-100	BTS-1.5Meg	
R71	NTC		230130-1		Note 1
R72	1.2Meg	½	230105-99	BTA-1.2Meg	
R73	13KΩ 5%	½	230094-186	BTS-13K 5%	
R74	1000Ω	½	230104-63	BTS-1000	
R75	220Ω	½	230104-54		
R76	220Ω	½	230104-54		
R77	100KΩ	½	230104-86		
R78	100KΩ	½	230104-86		
R79	470KΩ	½	230104-94	BTS-470K	
R80	4.7Meg	½	230104-106		
R81	680KΩ	½	230094-179		
R82	1300Ω 5%	½	230094-182		
R83	100KΩ 5%	½	230094-207		
R84	270KΩ 5%	½	230094-211		
R85	12KΩ	½	230104-75	BTS-12K	
R86	470KΩ	½	230104-94	BTS-470K	
R87	10KΩ	5	240071-9	PW10-10K	
R88	1500Ω	1	230105-64	BTA-1500	
R89	15KΩ	½	230105-76	BTA-15K	
R90	18Ω	3	230105-41		
R91	680Ω	½	230104-72		
R92	3.9Ω	½	230107-3		
R93	680Ω	½	230104-80	BTS-680	
R94	270Ω	3	230105-55	BTB-270	
R95	120KΩ	½	230110-1	BTS-120K	

Note 1. Negative temperature coefficient resistor. Do not measure.
* R65A, R65B, R65C, C53A, C53B, C53C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⑥	575VCT	5V ⑥	6.3V ⑥	300071-1	P9733	P3077	P8164		R-52BC ①
	1.6A	.220ADC	3A	9.5A						

① Parallel & phase 6.3V, 5A windings tape 6.3V, 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: MAGNAVOX PART No	Halldorson PART No	Merit PART No.	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No.	Triad PART No
T2	Horiz. Output Trans.	360614-1						FLY-79 *	
T3	Vert. Output Trans.	320254-3						25S54	A-104X
T4A	Yoke(90°)Horiz.(21MH	380617-1	ZI806	A-3039	336T1	V312	A-6141	DY-16A ④	T-41-1③
B	Vert. (45MH)	380617-2 ①	DF807③	MDF-82③	335D ③	Y90F19, 43 ③	DY-16A ④		
		380618-1 ②							
T5A	Horiz.Width-Series Coil (.3-2.3MH)	380585-2		MWC-10				WC-24	
B	Parallel Coil (4.3-32MH)								

① Alternate deflection yoke.
② Yoke rear cover.
③ Use original yoke damping network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8						8	
	5						6	
	3						3	
	2						2	
	1						1	
Convert Width Coil Across	2 & 1						2 & 1	
Special Notes							④	

④ If insufficient width, add capacity (approximately 50-100MMF ④ 4KV (Minimum) across horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T6	3.5KΩ	3.2Ω	320068-2B	Z1007	A3018	A3340	28S50	S-53X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: MAGNAVOX PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	8"	PM	3.2Ω		8A2I	20S52	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L2	IF Trap	0Ω						
L3	IF Trap	0Ω						
L4	Ant. Trans.	0Ω	C1 0Ω	380490-2				
L5	IF Trap	2.8Ω		360801-5				4.7 Microhenries, IRC part #CLA Channel 13
L6	VHF Ant. Coil	0Ω						
L7	VHF Ant. Coils	0Ω						
L7	UHF IF Coil	0Ω		360803-1				
L8	Neut. Coil	0Ω						
L9	VHF RF Coil	0Ω						Channel 13
L10	VHF RF Coils	0Ω						
L11	UHF IF Coil	0Ω						
L13	VHF Mixer Grid Coil	0Ω						Channel 13
L13	VHF Mixer Grid Coils	0Ω						
L14	UHF IF Coil	0Ω						
L15	VHF Osc. Coil	0Ω						Channel 13
L16	VHF Osc. Coils	0Ω						
L17	VHF Osc. Coil	0Ω						Channel 6
L18	RF Coil	1.9Ω		380801-9				1 Microhenry
L19	Conv. Plate	.1Ω		360802-1				
L20	1st. Video IF	.1Ω		360540-1	17-4534 *	TV-130 ⑧	S219 ⑧	
L21	2nd. Video IF	.1Ω	.1Ω	360581-1	17-4533	TV-130	S219	
L22	3rd. Video IF	.1Ω	.1Ω	360582-1	17-5003 A	TV-128 A	S233 A	Includes 47.25MC trap
L23	Shunt Peaking Coil	17Ω		380633-4	19-3500		S138	450 Microhenries
L24	Series Peaking Coil	9Ω		380633-5	19-3380		S139	150 Microhenries
L25	Shunt Peaking Coil	13Ω		380632-9	19-3280	TV-126	S181	235 Microhenries
L26	Shunt Peaking Coil			380632-7	19-4400		S136	400 Microhenries
L27	1st. Sound IF	.5Ω		360584-1	20-1005	TV-121	1469	
L28	2nd. Sound IF	.5Ω		360584-1	17-3400	TV-121	1468	
L29	Discriminator	1.7Ω	1.6DCT	360613-1	17-3498	TV-116	S205	

* Use winding with 56KΩ resistor.
⑧ Use one winding only.
▲ Use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.: PRI.	SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L30	55Ω		380579-1	19-1578	TV-163	6210			R5-5	

FILTER CHOKE

ITEM No	RATINGS: TOTAL DIRECT CURRENT	D C RESISTANCE	INDUCTANCE (@ CURRENT 1000 μ_a)	RELIEVE WITH PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L31	.220 ADC	36Ω	.58H	380068-2B	C8937 ①	C2895 ①	C2328 ①	28C40 ①	C-17X ①

① Drill one new mounting hole.

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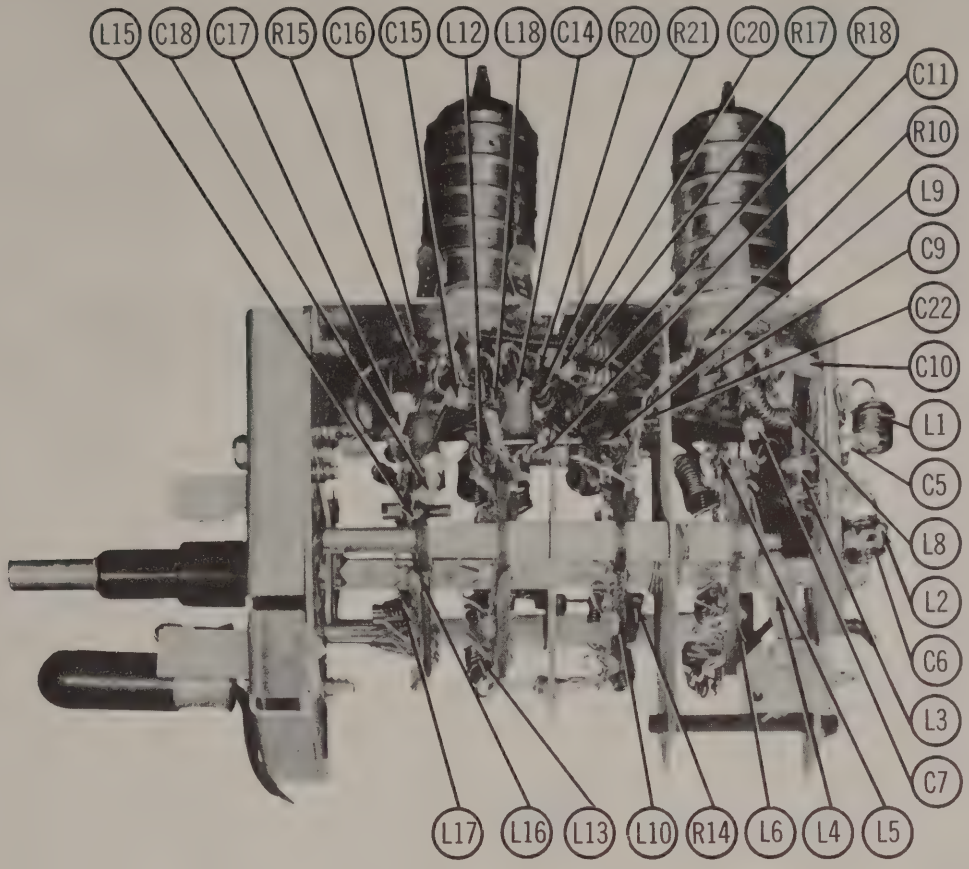
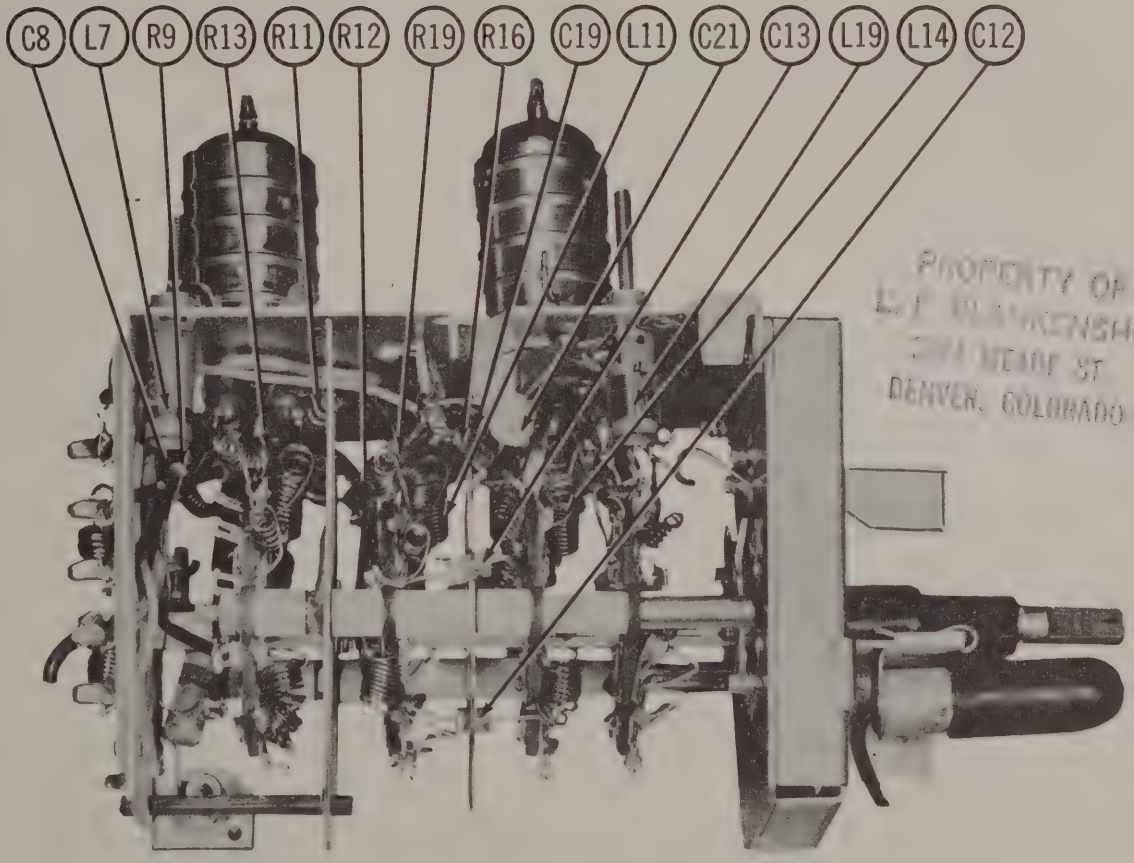
MAGNAVOX CHASSIS CMUA475AA, CMUA475AA, CMUA479AA, CMUA480AA, CMUA481AA, CTA473AA, CTA476AA, CTA479AA, CTA480AA, CTA481AA (*600 Series)



RF TUNER-RIGHT SIDE



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RF TUNER-LEFT SIDE

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

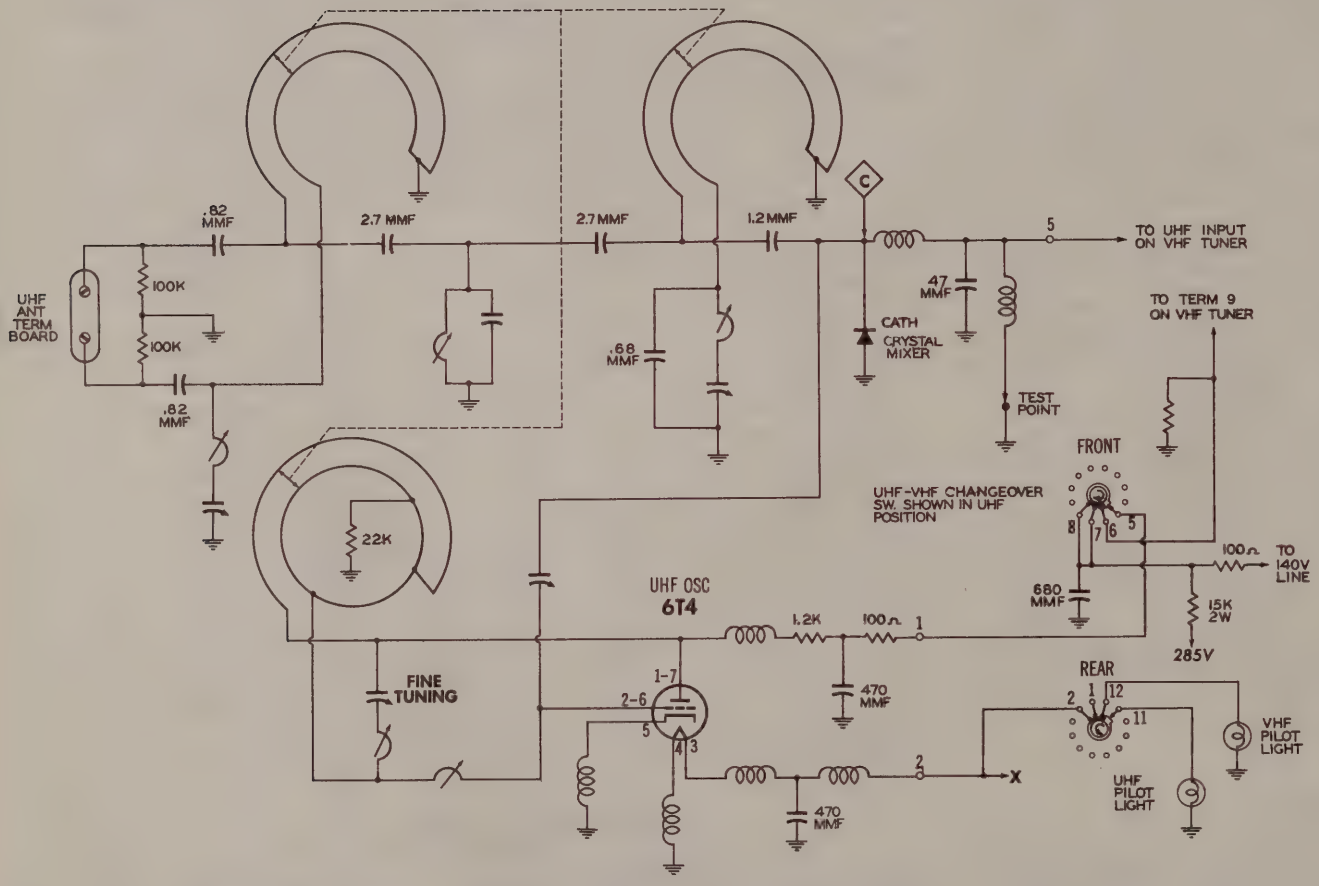
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MAGNAVOX PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1/4A 250V	180157-15		312. 250 (3AG 1/4A)	357001	AGC 1/4	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	SYLVANIA PART No.	
M2	1N60		1N60	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M3	Tuner	700458-3	VHF - All chassis
M4	Tuner	700459-1	UHF - Chassis CMUA475AA, CMUA476AA, CMUA479AA, CMUA480AA, CMUA481AA
M5	Video Det. Assy.	360607-1	Includes M2, coils, resistor and capacitor
M6	Switch	160169-3	Local-Fringe (DPDT-Rotary, wafer type)
M7	Centering Device	635116-1	
M8	Ion Trap	360492-5	



UHF TUNER PART NO. 700459-1 USED WITH CHASSIS CMUA 475AA, AND 476AA

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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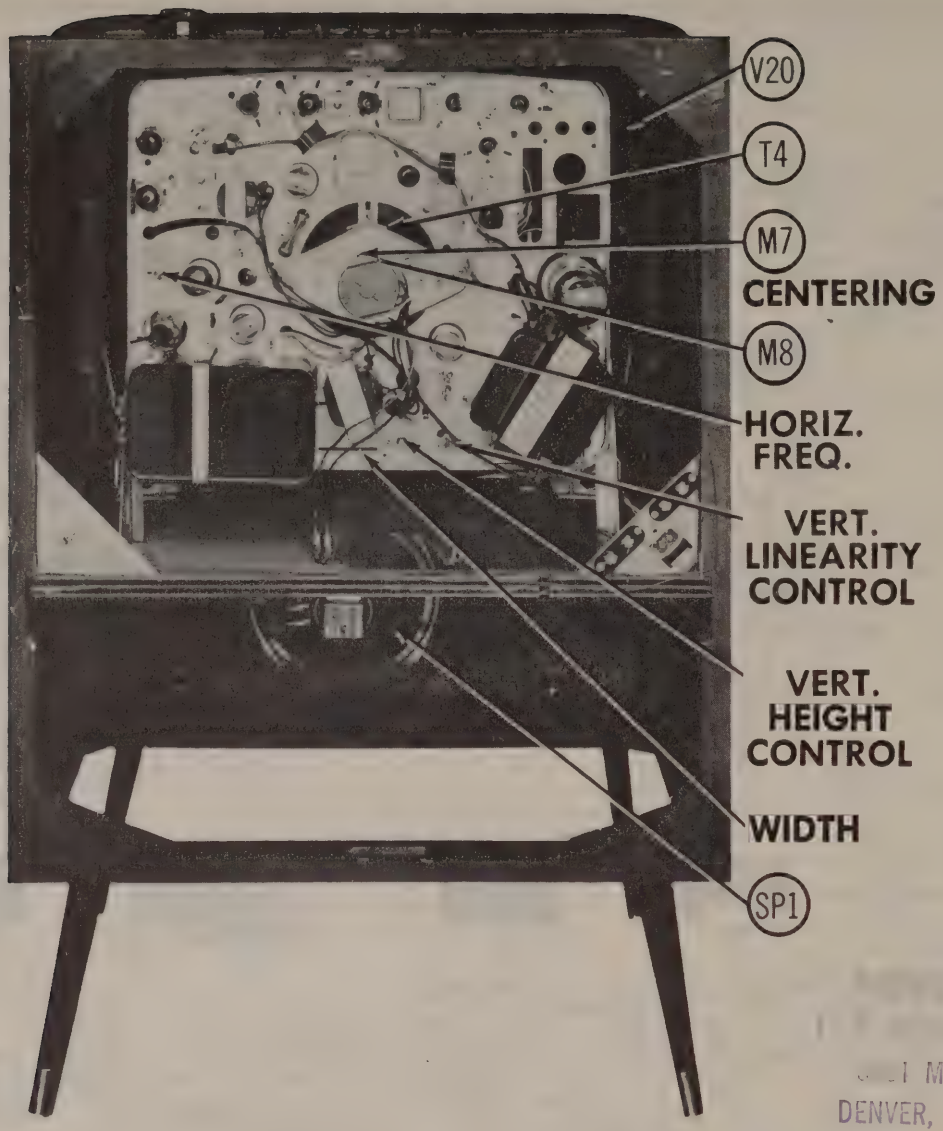
UHF TUNER SCHEMATIC



RTY OF
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DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

Turn the horizontal frequency slug (B1) slowly clockwise while switching off and on channel until picture just loses sync. Turn B1 counter clockwise until picture just pulls into sync, then turn B1 an additional half-turn counter clockwise.

The picture should hold sync at both extreme ends of the horizontal hold control.

If necessary, readjust B1 slightly and test for sync and pull-in as above.

Adjust the width slug (B2) for a picture slightly wider than is necessary to fill the picture mask horizontally.

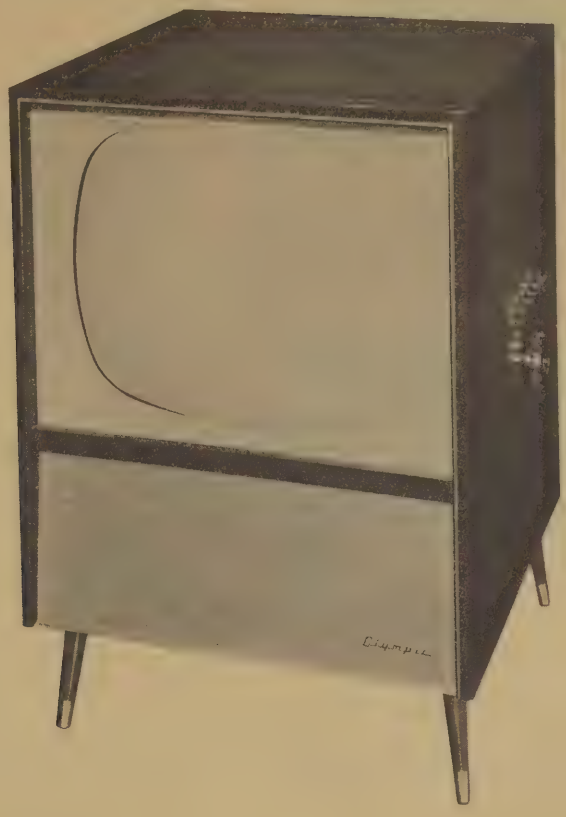
PHOTOFACT* Folder

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . unless it has been purchased as part of a complete volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



PROPERTY OF
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DENVER, COLORADO

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)

OLYMPIC MODEL C21BD35

TRADE NAME	Olympic Models C21BD35, K21BD34, T21BD19 (Ch. BD), C21BF21, T21BF20 (Ch. BF)
MANUFACTURER	Olympic Radio & Television, Inc., 34-01 38th. Ave., Long Island City 1, N.Y.
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.26 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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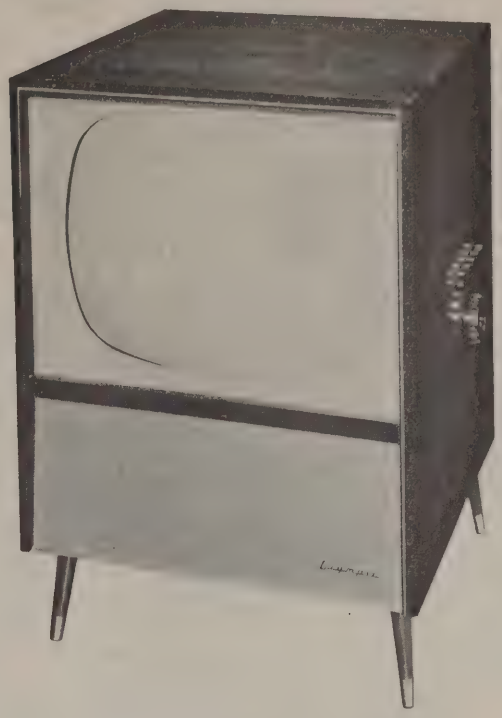
PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)



DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from side panel of cabinet.

2. Remove 2 metal screws. Remove rear cover.

3. Disconnect speaker plug, HV lead, picture tube socket and yoke plug.

4. Remove wing nut from picture tube mounting brace. Remove 5 chassis bolts. Remove chassis.

5. Remove 2 speaker nuts. Remove speaker.

MODELS	CHASSIS
C21BD35, K21BD34, T21BD19	BD
C21BF21, T21BF20	BF

PROPERTY OF
ANKENSHIP
3924 MEADE ST.
COLORADO

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding wood strip at the top edge of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust horizontal oscillator, it is necessary to remove rear cover and supply power to the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L26) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set. Adjust the buzz control (R8) for maximum volume and minimum buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)

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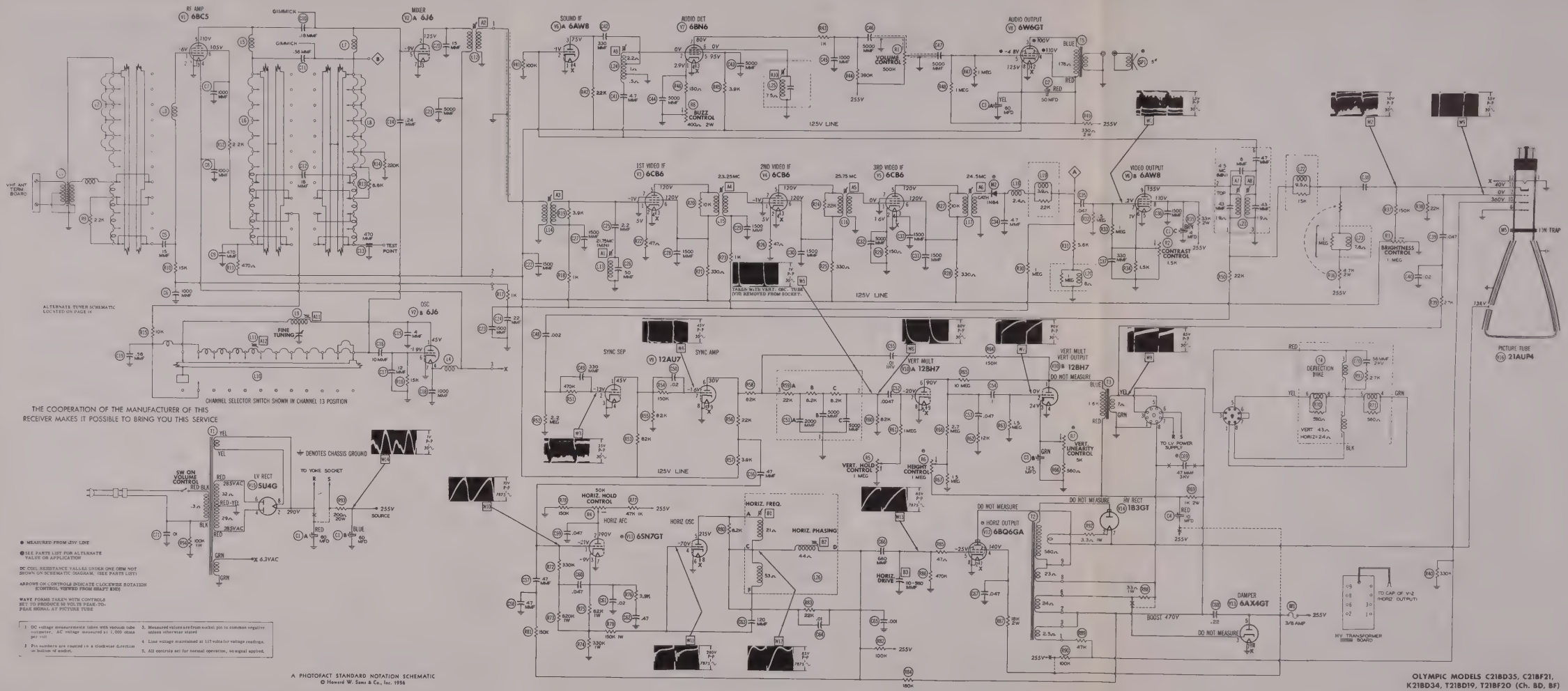
RF AMP V1 6BC5
GIMMICK
MIXER V2A 6J6
OSC V2B 6J6
SOUND IF V3A 6AW8
AUDIO DET V7 6BN6
AUDIO OUTPUT V8 6W6GT
1ST VIDEO IF V1 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6B 6AW8
SYNC SEP V9 12AU7
SYNC AMP
VERT MULT V10A 12BH7
VERT MULT VERT OUTPUT V10B 12BH7
HORIZ. HOLD CONTROL
HORIZ AFC
HORIZ OSC V11 6SN7GT
HORIZ. FREQ.
HORIZ. PHASING
HORIZ OUTPUT V12 6BQ6GA
DAMPER 6AX4GT
HV RECT V14 1B3GT
LV RECT V15 5U4G
PICTURE TUBE V16 21AUP4
VOLUME CONTROL 500K
BUZZ CONTROL 400Ω 2W
CONTRAST CONTROL 1.5K
BRIGHTNESS CONTROL 1 MEG
VERT. HOLD CONTROL 1 MEG
HEIGHT CONTROL 1 MEG
VERT. LINEARITY CONTROL 5K
FINE TUNING
SW. ON VOLUME CONTROL
TEST POINT
DEFLECTION YOKE
1 M TRAP
125V LINE
DO NOT MEASURE
BOOST 470V
TO LV POWER SUPPLY
TO CRT (V-2 HORIZ OUTPUT)
HV TRANSFORMER BOARD
VHF ANT TERM BOARD
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 14
TABLES WITH VERT. OSC. TUBE (V9) REMOVED FROM SOCKET.
DENOTES CHASSIS GROUND
TO YOKE SOCKET
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● MEASURED FROM 125V LINE

◐ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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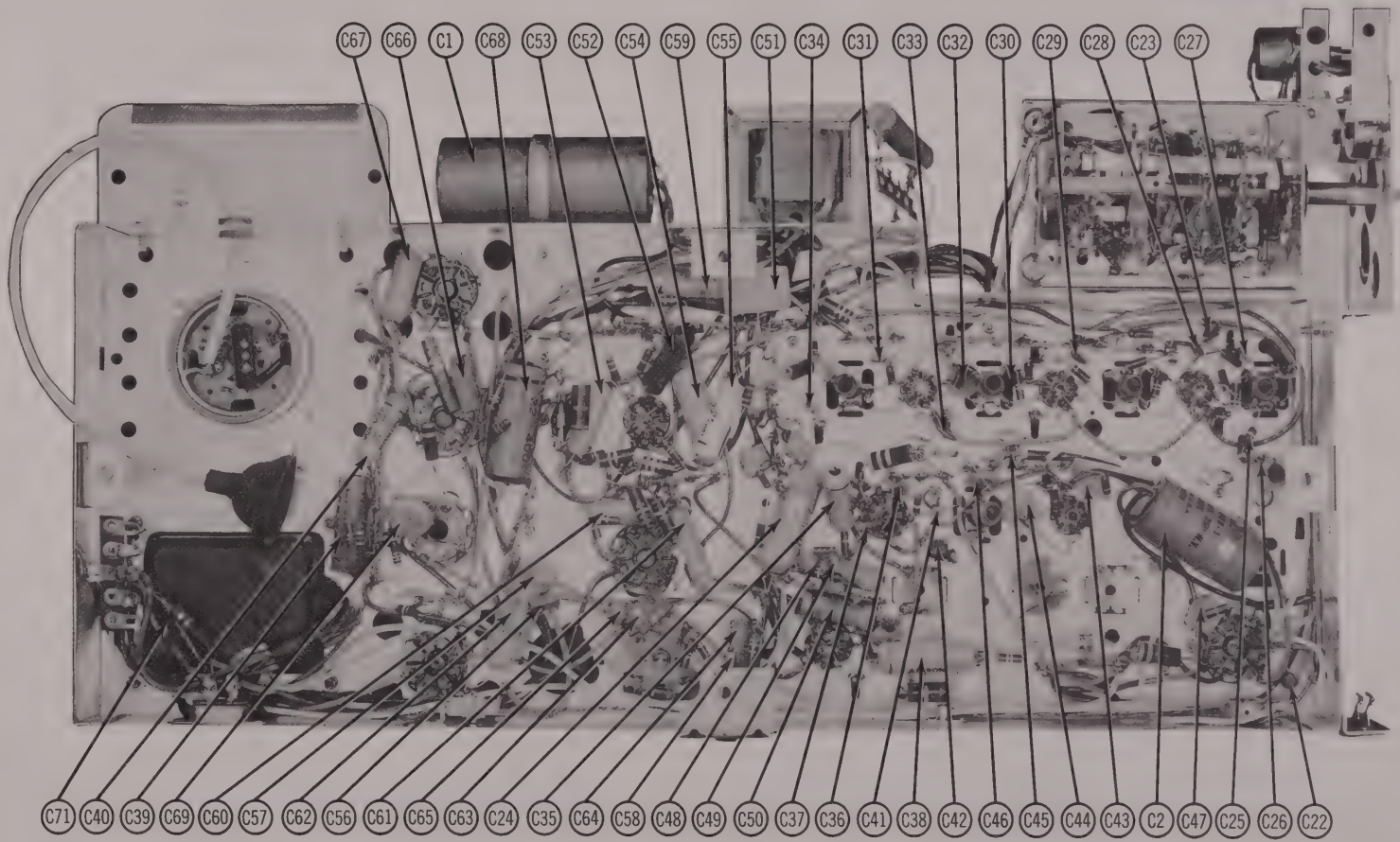
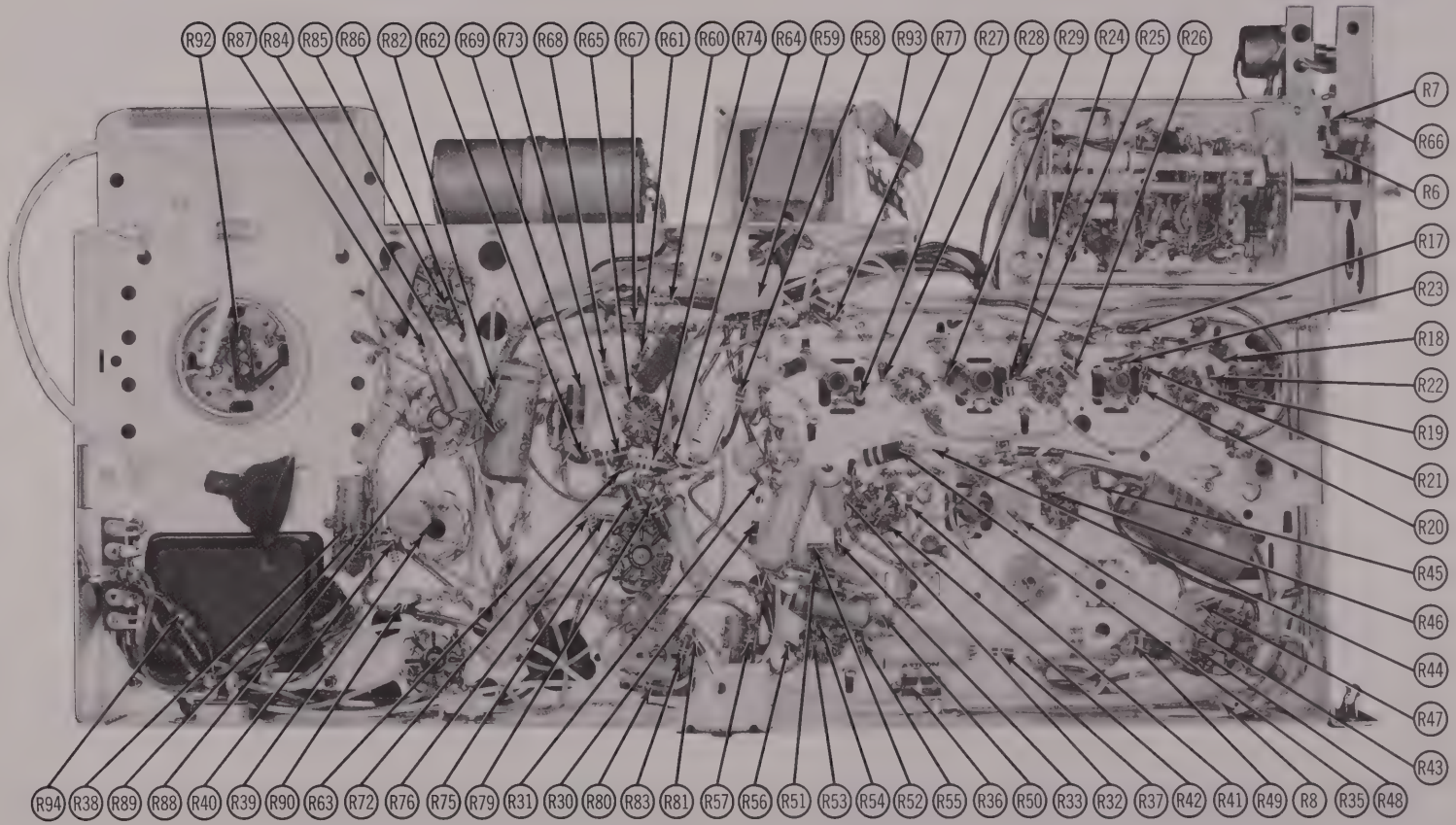
OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (Ch. BD, BF)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
[redacted] MEADE ST
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART

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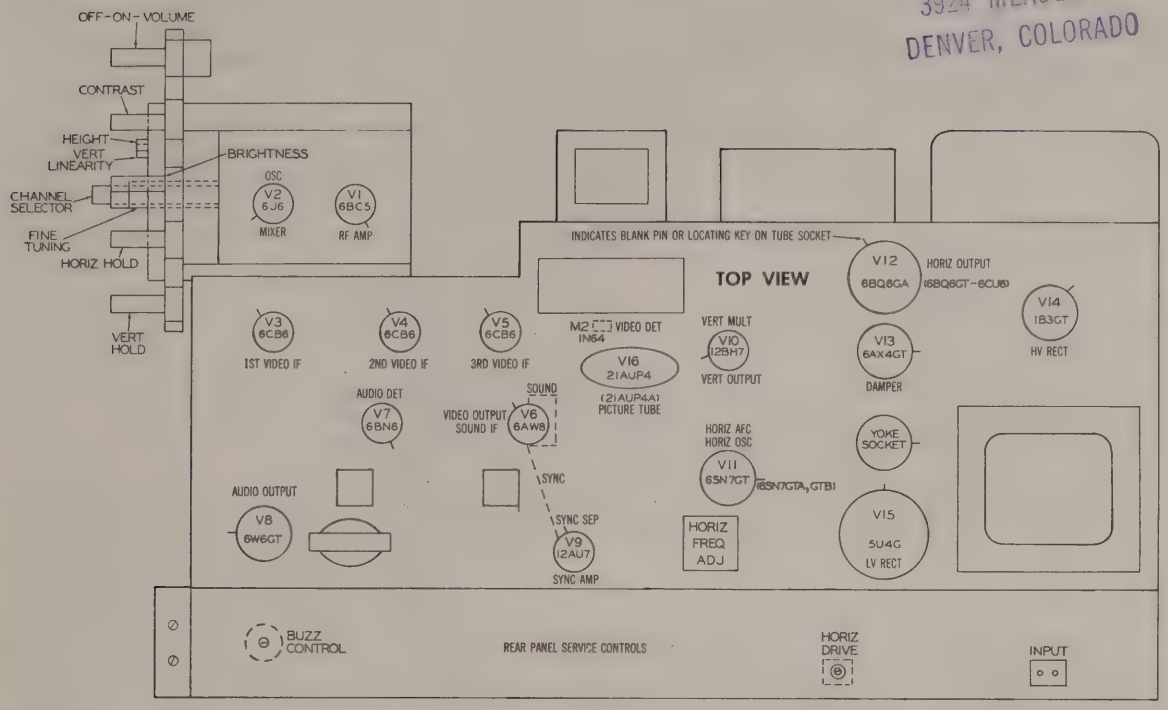
3924 MEADE ST.
DENVER, COLORADO



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V15

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V8
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V16
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V9, V10
No horiz. sync - V9, V11
No vert. or horiz. sync - V9

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V16, Fuse (M1)
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, V15
Vert. off freq. - V9, V10
Horiz. off freq. - V9, V11

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

If oscillation occurs during alignment, detune A6 and adjust A2, A3, A4, and A5 as in steps 2 thru 4 and then adjust A6 as in step 5. For step 2 connect a clip lead from ungrounded side of C24 to chassis. Remove clip lead after adjusting A2 and A3. Use only enough generator output for usable indication.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to floating tube shield over converter tube. Low side to chassis.	Not used	21.75MC	Any unused high-band channel	Use VTVM DC probe thru 100K to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	24MC (10MC Swp.)	22.75MC	"	Vert. Amp. thru network (Fig. 1) to pin 5 (plate) of 6CB6 (V5). Low side to chassis.	A2, A3	Adjust so that 22.75MC marker falls just on trap side of curve peak as shown in Fig. 2. Adjust so that both peaks are equal. Remove AGC shorting wire.
3.	"	"	Not used	23.25MC	"	Use VTVM DC probe thru 100K to point (A). Common to chassis.	A4	Adjust for maximum deflection.
4.	"	"	"	25.75MC	"	"	A5	"
5.	"	"	"	24.5MC	"	"	A6	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 1.5 volt bias supply to the ungrounded side of C24. Connect positive side to chassis. Use only enough sweep generator output for usable pattern on scope. Keep marker generator output low. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	330MMF Capacitor	High side thru 330MMF capacitor to point (B). Low side to chassis.	24.0MC (10MC Swp.)	21.75MC 22.75MC 26.25MC	Any unused channel	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		If separate marker generator is used, couple it loosely to an ungrounded tube shield floating over converter tube (V2). Check for response curve similar to Fig. 3. The 26.25MC marker should appear on the curve at approximately 50% on the curve by adjusting A6. A4 is used to position 22.75MC marker.

4.5MC TRAP ALIGNMENT

Set contrast control for maximum contrast. Remove 6CB6 (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side thru .01MFD to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Common to chassis.	A7	Adjust for MINIMUM deflection. Use maximum generator signal. Replace V5 in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in any local TV station. Adjust the fine tuning control to emphasize 4.5MC beat interference in picture. Adjust A7 to minimize the 4.5MC beat in the picture.

SOUND IF ALIGNMENT

Turn the set on and tune in a strong TV station signal. Set the buzz control (R8) to its mid range position. Adjust A10 for maximum sound, then adjust R8 for maximum sound and minimum buzz. Repeat adjustments of A10 and R8 for maximum volume and minimum buzz.

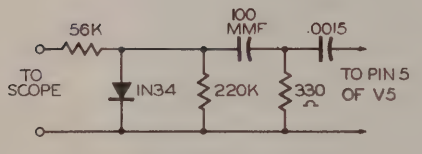


FIG. 1

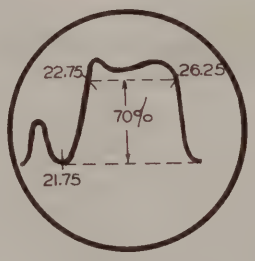


FIG. 2

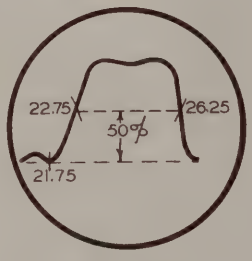


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT FOR TUNER CL-4042

Set the channel selector to the highest channel available in that area. Adjust contrast and volume controls for normal picture and sound. Set the fine tuning to the center of its range. With a nonmetallic alignment tool, adjust all for the clearest sound and sharpest picture detail. Check all other channels from 7 to 13, available in that area and make slight compromise adjustments of all if necessary for best reception on all high band channels. For low band channels, set station selector switch to the highest low band channel (2 to 6) operating in that area and adjust A12 for the clearest sound and sharpest picture detail. Check all other low band channels operating in that area and make compromise adjustment of A12 if necessary for best picture and sound.

RF AND MIXER ALIGNMENT FOR TUNER CL-4042

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

RF AND MIXER ALIGNMENT FOR TUNER CL-3865

Connect a short clip lead across C24. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205. 25MC 209. 75MC	12	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A13, A14, A15	Adjust for curve similar to Fig. 4 with markers above 90%.
9.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		If markers fall below 70% on any channel, make compromise adjustment of A13, A14, and A15 with channel switch set to that channel. Then check all other channels to see that they have not been seriously affected. Remove clip lead from across C24.
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

OSCILLATOR ALIGNMENT FOR TUNER CL-3865

The channel oscillator adjustment screws are reached through a hole just to the left and above the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A16	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A17	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A18	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A19	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A20	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A21	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A22	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A23	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A24	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A25	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A26	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A27	

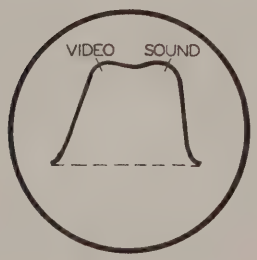


FIG.4

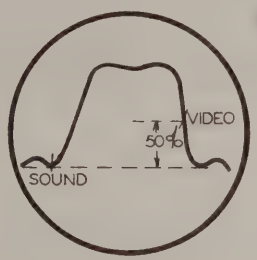


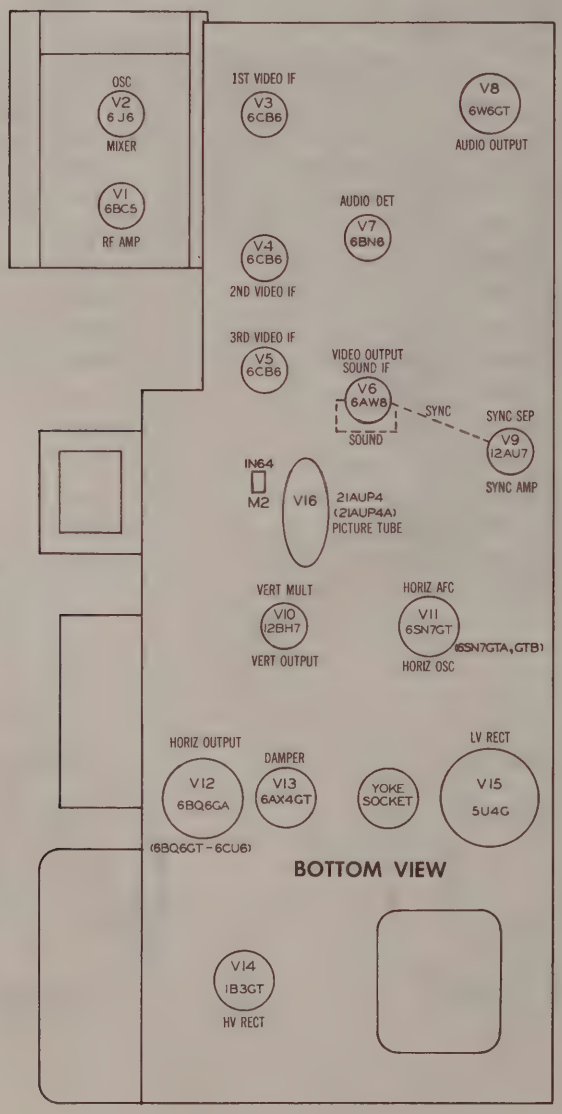
FIG.5

PROPERTY OF
L. F. KLANCHEMP
3511 MADISON ST.
DENVER, COLORADO

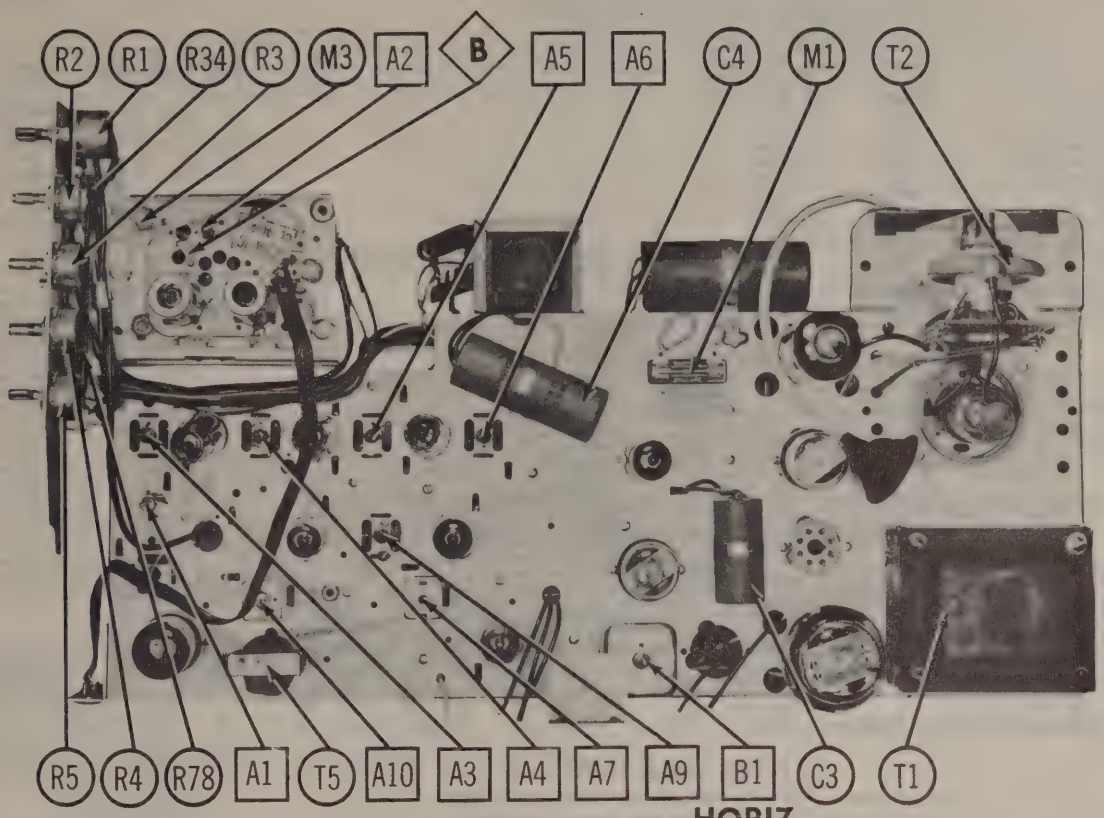
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	0Ω	.1Ω	■ 470Ω	■ 2.7KΩ	0Ω		
V 2	6J6	■ 10KΩ	■ .2Ω	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	.1Ω	0Ω	■ 330Ω	■ 330Ω	0Ω		
V 4	6CB6	1Meg	47Ω	.1Ω	0Ω	■ 330Ω	■ 330Ω	0Ω		
V 5	6CB6	.3Ω	150Ω	.1Ω	0Ω	■ 330Ω	■ 330Ω	0Ω		
V 6	6AW8	0Ω	100KΩ	■ 22KΩ	.1Ω	0Ω	40Ω	600KΩ	† 33KΩ	† 5KΩ
V 7	6BN6	350Ω	3.2Ω	.1Ω	0Ω	■ 3.9KΩ	7.5Ω	† 390KΩ		
V 8	6W6GT	0Ω	.1Ω	† 700Ω	† 550Ω	500KΩ	TP	0Ω	70KΩ	
V 9	12AU7	■ 50KΩ	2.7Meg	0Ω	0Ω	0Ω	■ 25KΩ	200KΩ	0Ω	.1Ω
V 10	12BH7	▲ 2.6KΩ	1.5Meg	2.7KΩ	0Ω	0Ω	▲ 2Meg	1.6Meg	0Ω	.1Ω
V 11	6SN7GT	1.5Meg	† 40KΩ	400KΩ	480KΩ	† 70KΩ	0Ω	0Ω	.1Ω	
V 12	6BQ6GA	TP	0Ω	TP	† 18KΩ	470KΩ	NC	.1Ω	0Ω	TOP CAP ▲ 42Ω
V 13	6AX4GT	NC	NC	130KΩ	NC	† 200Ω	TP	0Ω	.1Ω	
V 14	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 620Ω
V 15	5U4G	NC	80KΩ	NC	29Ω	NC	32Ω	NC	80KΩ	
V 16	21AUP4A	0Ω	22KΩ	PIN 6 0Ω	PIN 10 ▲ 50KΩ	PIN 11 ■ 300KΩ	PIN 12 .1Ω			

■ MEASURED FROM 125V LINE.
† MEASURED FROM PIN 2 OF V15.
▲ MEASURED FROM PIN 3 OF V13.
TP-TIE POINT.
NC-NO CONNECTION.

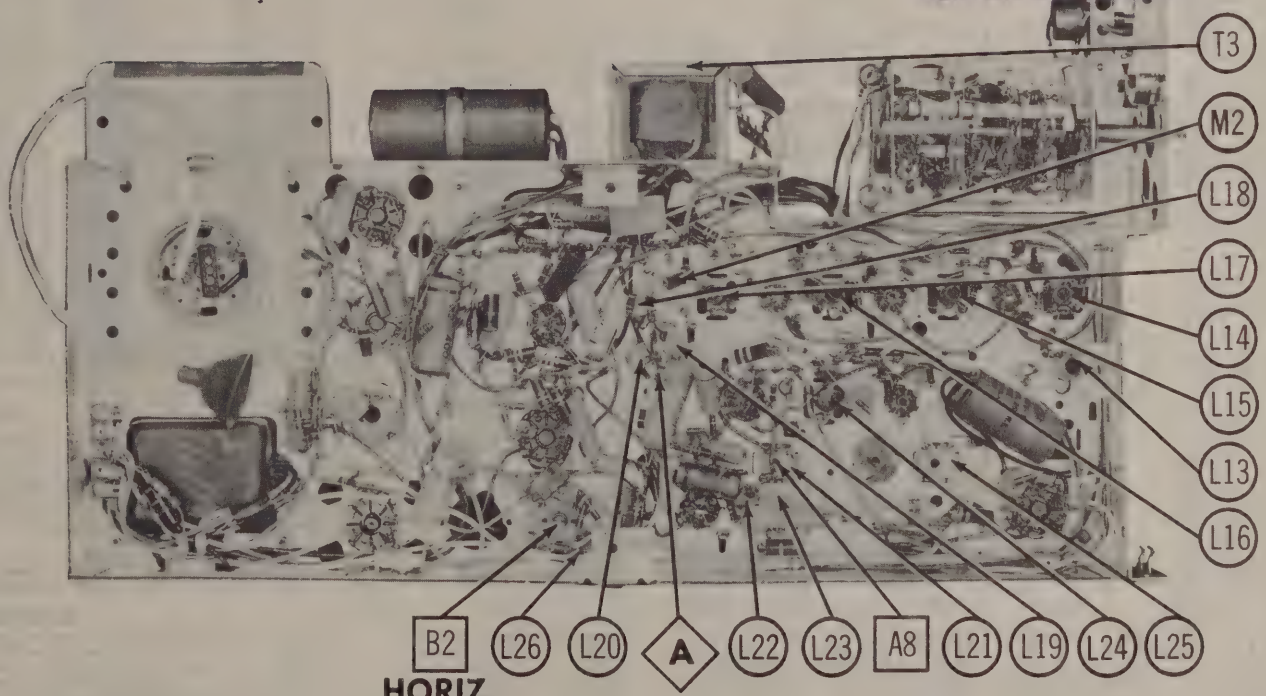


TUBE PLACEMENT CHART



CHASSIS TOP VIEW

PROPERTY OF
L.F. ENTERPRISES
2941 LOWELL ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BC5	6BC5	
V2	Osc. -Mixer	6J6	6J6	
V3	1st Video IF Amp.	6CB6	6CB6	
V4	2nd Video IF Amp.	6CB6	6CB6	
V5	3rd Video IF Amp.	6CB6	6CB6	
V6	Video Output-Sound IF Amp.	6AW8	6AW8	
V7	Audio Det.	6BN6	6BN6	
V8	Audio Output	6W6GT	6W6GT	
V9	Sync Separator-Sync Amp.	12AU7	12AU7	
V10	Vert. Mult. -Vert. Output	12BH7	12BH7	
V11	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	6SN7GTA of 6SN7GTB may be used as an alternate.
V12	Horiz. Output	6BQ6GA	6BQ6GA	6CU6 of 6BQ6GT may be used as an alternate.
V13	Damper	6AX4GT	6AX4GT	
V14	HV Rect	1B3GT	1B3GT	
V15	LV Rect.	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: OLYMPIC PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	21AUP4	21AUP4 21AUP4A ①	21AUP4A ① 21AUP4A/B ①	21AUP4 ① 21AUP4A ② 21AUP4A/B ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	350	CO-3380		B034	WQ795			TVL-2668
B	60	350			BR435	TC60			TVA-1601
C	4	350							
C2	50	250	CO-2068-1	PRS250V50	BR5025	TC59	TD-50-250	MT-4550	TVA-1511
C3A	60	200	CO-3856		BR6025	WD340	TD-60-250	MTD-4530	TVA-1613
B	125	50			BRH5015		TD-150-50	MTH-5010	TVA-1311
C4	10	450	CO-4022	PRS450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5TCC-Q15	
C6	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C7	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C8	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C10	.18									
C11	.56									
C12	.18									
C13	470			EF-0005	MFT-500				503C-T47	
C14	.24									
C15	4									
C16	10				TCN-10	TN01	N750A-100	NT-541	5TCU-Q1	
C17	[illegible]				TCZ-12	TZ10	NP0K-120			
C18	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C19	.56									
C20	15				NP0-SI15	TCZ-15	TZ11	NP0K-150		5TCC-Q15	
C21	5000				BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C22	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C23	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C24	.22	200	CO-H-2224		P288N-22		CUB2P22		PT4022	2TM-P22	
C25	2.2		CO-1112		NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C26	50				N750-SI50	TCN-47	N034	N750K-470	NT-5447		
C27	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C28	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C29	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C30	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C31	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C32	5000		CCD502X		BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C34	4.7		CO-1083		NP0-SI4.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCCB-V47	
C35	.047	400	CO-H-4473		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C36	1500		CCD152X		BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C37	330		CCD331M		SI330	DD-331	TP43	811-331	UC-5333	5GA-T33	
C38	.1	400	CO-H-4104		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C39	.047	400	CO-H-4473		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C40	.02	400	CO-H-4203		BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	
C41	4.7		CO-1083		NP0-SI4.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-5547	5TCCB-V47	
C42	330		CCD331M		BPD-00033	DD-331	TP43	811-331	UC-5333	5GA-T33	
C43	5000		CCD502X		BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	5000		CCD502X		BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C45	1000		CCD102M		BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C46	5000		CCD502X		BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C47	5000		CCD502X		BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	.002	600	CO-H-6202		BPD-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C49	330		CCD331M		BPD-00033	DD-331	TP33	811-331	UC-5333	5GA-T33	
C50	.02	400	CO-H-4203		BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	
C51A	2000								DC-522		
B	5000		♦PC2435		♦PA110	♦PC-100	♦115TM1	♦1405-01	DC-525	♦V-2	
C	5000								DC-525		
C52	.0047	600	CO-O-6472K		1464-0047		1R5D47		MCB465	6TM-D47	
C53	.047	400	CO-H-4473		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C54	.1	400	CO-H-4104		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C55	.01	1000	CO-O-X103		DAC-27	DD-103	CUB16S1		PT1611	10TM-S1	
C56	47	500	RCM15C470K		NP0-DI47	D6-470	22R5Q47	831-470	MCB225	MS-447	
C57	47	500	RCM15C470K		NP0-DI47	D6-470	22R5Q47	831-470	MCB225	MS-447	
C58	47	500	RCM15C470K		NP0-DI47	D6-470	22R5Q47	831-470	MCB225	MS-447	
C59	.047	400	CO-H-4473		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C60	.047	400	CO-H-4473		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C61	.02	400	CO-H-4203		BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	
C62	.47	200	CO-H-2474		P288N-47		CUB2P47		PT4047	2TM-P47	
C63	120	500	RCM20C121K		NP0-SI120	D6-121	22R5T12	811-121		MS-312	
C64	.01	600	CO-B-6103		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C65	.001	600	CO-O-6102K		BPD-001		CUB6D1	811-102	MCB255	6TM-D1	

ITEM No.	RATING: CAP.	RATING: VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALA PART No
C66	680	500	RCM20A681M	SI680	D6-681
C67	.047	400	CO-H-4473	BPD-05	DF-503
C68	.22.	400	CO-H-4224	P488N-22	
C69	47	3000		HVD-30-47	DD30-47
C70	56	2000	CCD560K		DD30-56
C71	.01	600	CO-B-6103	BPD-01	D6-103

Note 1. Not used in some versions.
♦ Items C51A, C51B, C51C, R59A, R59B and R59C are com

CON

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMEN: OLYMPIC PART No.	CENTRALAB PART No.	CLARO PART
R1A	500KΩ	½	PT3615	AB-60	A47-50
B	Shaft		Not Req.	AK-4	KSS-3
C	Switch		Not Req.	KB-1	SWE-12
R2A	1500Ω	½	PT3618	AB-515	
B	Shaft		Not Req.	AK-4	
R3A	1Meg	½	PT3616	AB-69	A47-1M
B	Shaft		Not Req.	AK-4	KSS-3
R4A	50KΩ	½	PT3617	AB-31	A47-50
B	Shaft		Not Req.	AK-4	KSS-3
R5A	1Meg	½	PT3616	AB-69	A47-1M
B	Shaft		Not Req.	AK-4	KSS-3
R6A	1Meg	½	PT3665-1	BX-69	A47-1M
B	Shaft		Not Req.	Not Req.	FKS-1/
R7A	5000Ω	½	PT3619-1	BX-10	A47-50
B	Shaft		Not Req.	Not Req.	FKS-1/
R8	400Ω	2	PT3611		39-500

Note 1. Some versions use a dual unit for height and vertical li

RESIS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R9	2200Ω	½		BTS-2200	
R10	15KΩ	½		BTS-15K	
R11	470Ω	½		BTS-470	
R12	2200Ω	½		BTS-2200	
R13	6800Ω	½			
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	15KΩ	½			
R17	1000Ω	½	REB102M	BTS-1000	
R18	1000Ω	½	REB102M	BTS-1000	
R19	3900Ω	½	REB392K		
R20	10KΩ	½	REB103K		
R21	330Ω	½	REB331M	BTS-330	
R22	47Ω	½	REB470M	BTS-47	
R23	1000Ω	½	REB102M	BTS-1000	
R24	22KΩ	½	REB223K		
R25	330Ω	½	REB331M	BTS-330	
R26	47Ω	½	REB470M	BTS-47	
R27	10KΩ	½	REB103K		
R28	330Ω	½	REB331M	BTS-330	
R29	150Ω	½	REB151M	BTS-150	
R30	1Meg	½	REB105K	BTS-1Meg	
R31	5600Ω	½	REB562K	BTS-5600	
R32	1.5Meg	½	REB155K	BTS-1.5Meg	
R33	1Meg	½	REB105K	BTS-1Meg	
R34	1500Ω	½	REB152M	BTS-1500	
R35	33KΩ	2	RED333M	BTB-33K	
R36	4700Ω	2	RED472K	BTB-4700	
R37	150KΩ	½	REB154M	BTS-150K	
R38	22KΩ	½	REB223K	BTS-22K	
R39	2700Ω	½	REB272K	BTS-2700	
R40	330KΩ	½	REB334K-A	BTS-330K	
R41	100KΩ	½	REB104M	BTS-100K	
R42	22KΩ	½	REB223M	BTS-22K	
R43	1000Ω	½	REB102M	BTS-1000	
R44	390KΩ	½	REB394K	BTS-390K	
R45	3900Ω	½	REB392K	BTS-3900	
R46	150Ω	½	REB151M	BTS-150	
R47	1Meg	½	REB105K	BTS-1Meg	
R48	1Meg	½	REB105K	BTS-1Meg	
R49	330Ω	2	RED331M	BTB-330	
R50	22KΩ	½	REB223M	BTS-22K	
R51	470KΩ	½	REB474M	BTS-470K	
R52	2.2Meg	½	REB225M	BTS-2.2Meg	

♦ Items R59A, R59B, R59C, C51A,

TRANSFORM

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	OLYMPIC PART No.
T1	117VAC ③ 1.26A	550VCT ③ .155A	5V ③ 3A	6.3V ③ 7.8A	TR4007

① Drill new mounting holes.
② Tape 6.3V ③ 1.2A winding.
③ Parallel & phase 6.3 V ③ 6A windings.
④ Tape low HV winding, tape 5V ③ 3A winding, parallel &

TRANSFORMERS (

ITEM No.	USE	OLYMPIC PART No.	Halldorson PART No.	Meri PART
T2	Horiz. Output Trans.	TR3599-2	FB411 *①	HVO-9
T3	Vert. Output Trans.	TR3689	Z1900 ②	A-3039
T4A	Yoke-Horiz. (19.5MH)	CL3847	DF605 ④	MDF-7
B	Vert. (35MH)			

① Drill new mounting hole(s).
② Use 18 to 1 turns ratio.
③ Connect blue lead to plate (pin #1 of V10). Connect red lea ground & connect it & green lead of trans. to junction C4,
④ Connect horiz. yoke damping network across terms #3 &

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BC5	6BC5	
V2	Osc.-Mixer	6J6	6J6	
V3	1st Video IF Amp.	6CB6	6CB6	
V4	2nd Video IF Amp.	6CB6	6CB6	
V5	3rd Video IF Amp.	6CB6	6CB6	
V6	Video Output-Sound IF Amp.	6AW8	6AW8	
V7	Audio Det.	6BN6	6BN6	
V8	Audio Output	6W6GT	6W6GT	
V9	Sync Separator-Sync Amp.	12AU7	12AU7	
V10	Vert. Mult. -Vert. Output	12BH7	12BH7	
V11	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	6SN7GTA of 6SN7GTB may be used as an alternate.
V12	Horiz. Output	6BQ6GA	6BQ6GA	6CU6 of 6BQ6GT may be used as an alternate.
V13	Damper	6AX4GT	6AX4GT	
V14	RF Reot	1B3GT	1B3GT	
V15	LV Rect.	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: OLYMPIC PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	21AUP4	21AUP4	21AUP4A ①	21AUP4 ②	① Aluminized
		21AUP4A ①	21AUP4A/B ①	21AUP4A ②	② Silver Screen "86"
				21AUP4A/B ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	350	CO-3280		3034	WQ795			TVL-3668
B	80	350			BR435	TC60			TVA-1601
C	4	350							
C2	50	350	CO-2068-1	PR8250V50	BR5025	TC59	TD-50-350	MT-4550	TVA-1511
C3A	60	200	CO-3856		BR6025	WD240	TD-60-250	MTD-4530	TVA-1613
B	125	50			BRH50i5		TD-150-50	MTH-5010	TVA-1512
C4	10	450	CO-4022	PR8450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	15			SI15	D6-150	TP1I	GPIK-150	UC-5415	5TCC-Q15	
C6	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C7	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C8	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	470			SI470	D6-471	TP4S	GPIK-471	UC-5347	5GA-T47	
C10	.18									
C11	.56									
C12	.18									
C13	1000			SF-0006	MFT-500				503C-T47	
C14	.94									
C15	4									
C16	10				TCM-10	TW0L	N750A-100	NT-541	5TCU-Q1	
C17	12				TCZ-12	TZ1U	NP0K-120			
C18	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C19	.56									
C20	15			NP0-SI5	TCZ-15	TZ1U	NP0K-150		5TCC-Q15	
C21	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C22	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C23	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C24	.22	200	CO-H-2224	P288N-22		CSUBP22		PT4022	2TM-P22	
C25	3.3		CO-1113	BPD-SI3.3	TCZ-3R3	TZ0L	NP0A-3R3		5TCC-V33	
C26	50			NT50-SI50	TCM-47	N034	N750K-470	NT-5447		
C27	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C28	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C29	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C30	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C31	1500		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C32	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	1000		CCD152X	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C34	4.7		CO-1083	NP0-SI4.7	TCZ-4R7	TZ0T	NP0A-4R7	Z7-5547	5TCC-V47	
C35	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547		PT447	47M-S47	
C36	1000		CO-1003	BPD-001	DD-102	K071	801-001	DC-5215	5HK-D15	
C37	330		CCD331X	SI330	DD-331	TP4S	811-331	UC-5333	5GA-T33	
C38	.1	400	CO-H-4104	P488N-1	DF-104	CUB4P1		PT401	47M-P1	
C39	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547		PT4I47	47M-S47	
C40	.02	400	CO-H-4203	BPD-03	DD-203	CUB4S2	817-02	PT412	47M-S2	
C41	6.7		CO-1063	NP0-SI6.7	TCZ-6R7	TZ0T	NP0A-6R7	Z7-5547	5TCC-V47	
C42	330		CCD331M	BPD-00033	DD-331	TP4S	811-331	UC-5333	5GA-T33	
C43	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C45	1000		CCD102M	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C46	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C47	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	.002	600	CO-H-4202	BPD-002	DF-202	CUB4D2	C7P2-533-202	PT402	47M-D2	
C49	330		CCD331M	BPD-00033	DD-331	TP3S	811-331	UC-5333	5GA-T33	
C50	.03	400	CO-H-4303	BPD-03	DD-203	CUB4S3	817-02	PT413	47M-S3	
C51A	2000			●PC2425	●PA110	●PC-100	●115TM1	●4405-01	DC-525	●V-3
B	5000								DC-525	
C	5000								DC-525	
C53	.0047	600	CO-H-8472K	1466-0047		1R5D47			MC8465	47M-D47
C54	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547			PT4I47	47M-S47
C55	.1	400	CO-H-4104	P488N-1	DF-104	CUB4P1			PT401	47M-P1
C56	.01	1000	CO-O-X103	DAC-27	DD-103	CUB1S01			1GT4-S1	1GTM-S1
C57	47	500	RCM15C470K	NP0-D147	D6-470	22R5Q47	831-470		MC8225	MS-447
C58	47	500	RCM15C470K	NP0-D147	D6-470	22R5Q47	831-470		MC8225	MS-447
C59	47	500	RCM15C470K	NP0-D147	D6-470	22R5Q47	831-470		MC8225	MS-447
C59	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547			PT4I47	47M-S47
C60	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547			PT4I47	47M-S47
C61	.03	400	CO-H-4303	BPD-03	DD-203	CUB4S3	817-02		PT413	47M-S3
C62	.47	300	CO-H-2474	P288N-47		CUBP47			PT4047	2TM-P47
C63	150	500	RCM30C151K	NP0-SI20	D6-121	22R5T12	831-121			MS-313
C64	.01	600	CO-H-8103	BPD-01	D6-103	CUB4D1	C7P2-533-103		PT411	47M-D1
C65	.001	600	CO-O-8102K	BPD-001		CUB5D1	811-103		MC8265	47M-D1

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C66	500	500	RCM05A681M	SI680	D6-681	IW5I765	GP2K-681	UC-5368	1FM-S68	
C67	.047	400	CO-H-4473	BPD-05	DF-503	CUB4547		PT4I47	47M-S47	
C68	.22	400	CO-H-4224	P488N-22		CUB4P22		PT4022	47M-P22	
C69	47	2000		RVD-30-47	D030-470	V3Q47	5KV-470	DC30447	20GA-Q47	Note 1
C70	56	3000	CCD560K		D030-560		5KV-560	DC30456	20GA-Q56	
C71	.01	600	CO-B-8103	BPD-01	D6-103	CUB8S1	GP3-333-103	PT411	47M-S1	

Note 1. Not used in some versions.
● Items C51A, C51B, C51C, R58A, R59B and R59C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	PT3S15	AB-50	A47-500K-Z	Q13-153	U-48	Volume
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	U-36	Attach to R1A.
C	Switch		KS-1	SWZ-12		T6-1	US-26	Attach to R1A.
R2A	1500Ω	½	PT3S15	AB-SI5		Q17-109	U-5	Contrast
B	Shaft		Not Req.	AK-4		Not Req.	U-36	Attach to R3A.
R3A	1Meg	½	PT3S16	AB-59	A47-1Meg-S	Q11-137	U-36	Brightness
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	U-36	Attach to R3A.
R4A	50KΩ	½	PT3S17	AB-51	A47-50K-S	Q11-153	U-35	Horizontal Hold
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
R5A	1Meg	½	PT3S18	AB-59	A47-1Meg-S	Q11-137	U-36	Vertical Hold
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R5A.
R6A	1Meg	½	PT3S65-1	BX-59	A47-1Meg-S	Q11-137	TA1SL	Height-See Note 1
B	Shaft		Not Req.	Not Req.	FS2-1/4	Not Req.	Not Req.	Attach to R6A.
R7A	5000Ω	½	PT3S19-1	BX-10	A47-5000-S	Q11-114	TA53L	Width-See Note 1
B	Shaft		Not Req.	Not Req.	FS2-1/4	Not Req.	Not Req.	Attach to R7A.
R8	400Ω	2	PT3S21		39-500			Buz (Wire Wound)

Note 1. Some versions use a dual unit for height and vertical linearity, Part No. PT4023.

RESISTORS

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R9	2200Ω	½		BTS-2200	
R10	15KΩ	½		BTS-15K	
R11	47KΩ	½		BTS-470	
R12	2200Ω	½		BTS-2200	
R13	6800Ω	½			
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	15KΩ	½			
R17	1000Ω	½	REB102M	BTS-1000	
R18	1000Ω	½	REB102M	BTS-1000	
R19	3900Ω	½	REB392K		
R20	15KΩ	½	REB153K		
R21	330Ω	½	REB331M	BTS-330	
R22	47Ω	½	RES470M	BTS-47	
R23	1000Ω	½	REB102M	BTS-1000	
R24	22KΩ	½	REB223K		
R25	330Ω	½	REB331M	BTS-330	
R26	47Ω	½	RES470M	BTS-47	
R27	10KΩ	½	REB103K		
R28	330Ω	½	REB331M	BTS-330	
R29	150Ω	½	REB151M	BTS-150	
R30	1Meg	½	REB105K	BTS-1Meg	
R31	1Meg	½	REB105K	BTS-1Meg	
R32	1.5Meg	½	REB155K	BTS-1.5Meg	
R33	1.5Meg	½	REB155K	BTS-1.5Meg	
R34	1000Ω	½	REB102M	BTS-1000	
R35	330KΩ	½	REB334K		
R36	470KΩ	½	REB474K		
R37	3900Ω	½	REB392K		
R38	47KΩ	½	REB473K		
R39	150KΩ	½	REB154K	BTS-150K	
R40	22KΩ	½	REB223K	BTS-22K	
R41	2700Ω	½	REB272K	BTS-2700	
R42	330KΩ	½	REB334K-A	BTS-330K	
R43	100KΩ	½	REB104K	BTS-100K	
R44	22KΩ	½	REB223K	BTS-22K	
R45	100Ω	½	REB101M	BTS-100	
R46	390KΩ	½	REB394K	BTS-390K	
R47	1Meg	½	REB105K	BTS-1Meg	
R48	1Meg	½	REB105K	BTS-1Meg	
R49	330Ω	2	RED331M	BTB-330	
R50	22KΩ	½	REB223M	BTS-22K	
R51	470KΩ	½	REB474K	BTS-470K	
R52	2.2Meg	½	REB225M	BTS-2.2Meg	

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R53	82KΩ	½	REB823K	BTS-82K	
R54	150KΩ	½	REB154K-A	BTS-150K	
R55	33KΩ	½	REB333K	BTS-33K	
R56	22KΩ	½	REB223K	BTS-22K	
R57	3900Ω	½	REB392K	BTS-3900	
R58	82KΩ	½	REB823K	BTS-82K	
R58A	22KΩ	1	● PC2425	BTS-2200	
B	8200Ω			BTS-8200	
C	8200Ω			BTS-8200	
R60	82KΩ	½	REB823K	BTS-82K	
R61	1Meg	½	REB105K	BTS-1Meg	
R62	12KΩ	½	REB123K	BTS-12K	
R63	1.5Meg	½	REB155M	BTS-1.5Meg	
R64	150KΩ	½	REB154K-A	BTS-150K	
R65	10Meg	½	REB106K	BTS-10Meg	
R66	560Ω	½	REB561M	BTS-560	
R67	1.5Meg	½	REB155K	BTS-1.5Meg	
R68	2.7Meg	½	REB275K	BTS-2.7Meg	
R69	1000Ω	3	RED102M	BTB-1000	
R70	560Ω	½	REB561M		
R71	560Ω	½	REB561M		
R72	330KΩ	½	REB334K-A		
R73	330KΩ	½	REB334K-A		
R74	330KΩ 5%	1	REC334J-A		
R75	82KΩ 5%	½	REC823J-A		
R76	3900Ω	½	REB392K		
R77	47KΩ	½	REB473K		
R78	150KΩ	½	REB154K-A		
R79	150KΩ 5%	1	REC154J-A		
R80	820Ω	½	REB822K		
R81	150KΩ	½	REB154K-A		
R82	100KΩ	½	REB104K		
R83	22KΩ	½	REB223K		
R84	180KΩ	½	REB184K-A		
R85	47Ω	½	RES470M		
R86	470KΩ	2	REB474M	BTB-18K	
R87	18KΩ	1	RED183K		
R88	330Ω	½	REB331M		
R89	47KΩ	½	REB473M		
R90	100KΩ	½	REB104M		
R91	3700Ω	½	RES372K		
R92	3.3Ω	1	RE33XM1	BW1-3.3	
R93	200Ω	20	RE3249	3D-200	
R94	100KΩ 5%	½	REC104M	BTA-100K	

● Items R58A, R58B, R58C, C51A, C51B, C51C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	OLYMPIC PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	550VCT	5V	6.3V	TR4007	P9733 ①	P2836 ①	P8164 ①	26H33 ① ② ③	R-61BC ① ② ③
	p 1.26A	s .135A	p 3A	s 7.8A						

① Drill new mounting holes.
② Tape 6.3V ② 1.2A winding.
③ Parallel & phase 6.3V ② 8A windings.
④ Tape low HV winding, tape 5V ② 3A winding, parallel & phase 6.3V ② 5A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	TR3599-2	P8411 * ①	HVO-8 * ①	225T1 * ①	XO80 * ①	A-8252 * ①	FLY-14 * ①	D-10 * ①
T3	Vert. Output Trans.	TR3569	21900 ②	A-3039 ②	226T1 ②	V32 ② ③	A-8141 ② ③	28S54 ② ③	A-104X ② ③
T4A	Yoke-Horiz. (19.5MH)	CL3847	DF605 ③	MDF-75 ③	222DI ③	Y70P20/43 ③	DY-11A ③	Y-10 ③	Y-22-1 ③
B	Vert. (35MH)								

① Drill new mounting hole(s).
② Use 18 to 1 turns ratio.
③ Connect blue lead to plate (pin #1 of V10). Connect red lead of trans. to yellow lead of yoke. Remove green lead of yoke from ground & connect it & green lead of trans. to junction C4, R6, & R65. (Boost B+)
④ Connect horiz. yoke damping network across terms #3 & #2 use original if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9	9	9	9	9	9	9	9
8	8	8	8	8	8	8	8
6	8	8	7	7	7	7	7
2 & 3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	2.4KΩ	3-4Ω	TR2766-1	Z1101	A3025	A3332	26S58 ①	S-12X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: OLYMPIC PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	SK1778-2 ①	8A07	205S2	① C31BD35, T28BN9, C31BF31, T28BF30
	8"	PM	3-4Ω	SK1905-2 ②	8A3i	234S1	② K31BD34

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Trans.	00CT	0Ω					
L2	Ant. Coils	0Ω						
L3	Ant. Coil	0Ω						Channel 13
L4	Fil. Choke	0Ω						Channel 13
L5	RF Coil	0Ω						Channel 13
L6	RF Coils	0Ω						
L7	Mixer Grid Coil	0Ω						Channel 13
L8	Mixer Grid Coils	0Ω						Channel 13
L9	Osc. Coil	0Ω						Channel 13
L10	Osc. Coils	0Ω						
L11	Osc. Coil	0Ω						Channel 6
L12	Conv. Plate	.2Ω	.1Ω					
L13	21.75MC Trap	0Ω		CL2921-1				
L14	1st Video IF	.1Ω	.2Ω	CL2868	17-1062		6249	
L15	2nd Video IF	.3Ω	.3Ω	CL2859	17-1063	TV-116	6249	
L16	3rd Video IF	.3Ω	.3Ω	CL2859	17-1062	TV-116	6150	
L17	4th Video IF	.2Ω	.2Ω	CL2715	17-1063	TV-116	6249	
L18	Series Peaking Coil	2.4Ω		CL1535	19-3036	TV-180	6176	36 Microhenries
L19	Series Peaking Coil	3.8Ω		CL2401	19-3075 *	TV-181 *	6172 *	80 Microhenries; Wound on 22KΩ resistor
L20	Shunt Peaking Coil	8Ω		CL2403	19-3300 ■	TV-190 ■	6155 ■	300 Microhenries; Wound on 1Meg resistor
L21A	4.5MC Trap	1.9Ω		TR3386				
B	1st Sound IF	1.9Ω						
L22	Series Peaking Coil	9.5Ω		CL2308	19-3280 ▲	TV-185 ▲	6181 ▲	250 Microhenries; Wound on 15KΩ resistor
L23	Shunt Peaking Coil	7.8Ω		CL2403	19-3300 ■	TV-190 ■	6155 ■	300 Microhenries; Wound on 1Meg resistor Tapped p .5 and 1.5Ω
L24	2nd Sound IF	3.7Ω		CL4021	17-3412			
L25	Quadrature Coil	7.5Ω		CL2603-1		1481		

* Parallel with 22KΩ resistor.
■ Parallel with 1Meg resistor.
▲ Parallel with 15KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.: PRI.	SEC.	REPLACEMENT DATA: OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rom PART No.	Thordarson PART No.	NOTES
L26	21Ω	53Ω	TR2990-1	20-1402	TV-162	6183	205R1	H-100	HS-3	Waveform winding 44Ω

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: OLYMPIC PART No. FUSE	OLYMPIC PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	3/8A 250V	FU3958	FH3852	312.375 (3AG 3/8A)	357001	AGC 3/8	4405

CRYSTAL DIODES

ITEM No.	ORIG TYPE	REPLACEMENT DATA: OLYMPIC PART No.	SYLVANIA PART No.	NOTES
M2	1N54 *	1N54 or 1N60	1N60	Video Det. (Pigtail)

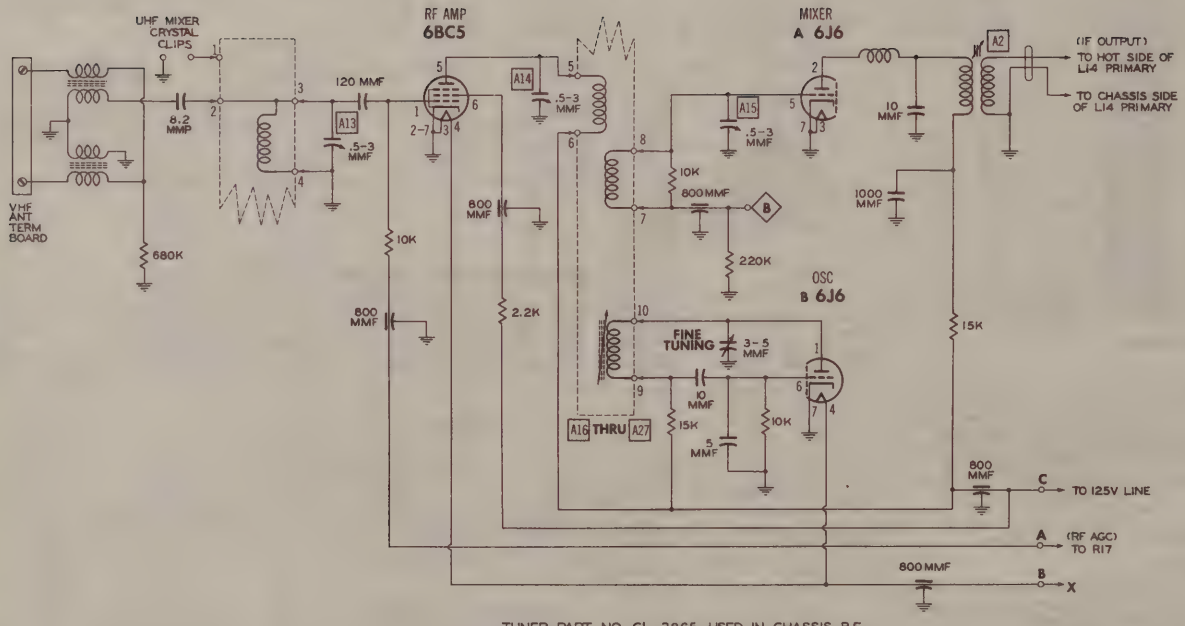
* Some versions may use crystal diode type 1N60 in this application.

OLYMPIC MODELS C21BD35, C21BF21, K21BD34, T21BD19, T21BF20 (CH. BD, BF)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuner	CL4042	VHF (Pentode)-Chassis BD
	Tuner	CL3865	VHF (Pentode)-Chassis BF
M4	Centering Device	PP2763	
M5	Ion Trap	PP2623	
B3	Trimmer Cap.	CT3526	Horiz. Drive (110-580MMF)
	Cabinet	CA3842-1	Models T21BD19, T21BF20
	Cabinet	CA3843-1	Models C21BD35, C21BF21
	Cabinet	CA4215	Model K21BD34
	Knob	KN3669	Channel Selector (Mahogany)
	Knob	KN3669-1	Channel Selector (Blonde)
	Knob	KN3671	Control (5 used)-Mahogany
	Knob	KN3671-1	Control (5 used)-Blonde
	Knob	KN3771	Fine Tuning (Mahogany)
	Knob	KN3771-1	Fine Tuning (Blonde)
	Knob	KN3869	Radio Volume (Mahogany)-Chassis BD, Combination Sets
	Knob	KN3869-1	Radio Volume (Tan)-Chassis BD, Combination Sets
	Knob	KN3870	Radio Tuning (Mahogany)-Chassis BD, Combiantion Sets
	Knob	NN3870-1	Radio Tuning (Tan)-Chassis BD, Combination Sets
	Knob	KN3874	AM-Ph-TV (Mahogany)-Model K21BD34, Combination Sets
	Knob	KN3874-1	AM-Ph-TV (Tan)-Model K21BD34, Combination Sets.
	Knob	KN3875	Radio (On-off-Tone)-Mahogany; Chassis BD, Combination Sets
	Knob	KN3875-1	Radio (on-off-tone)-Tan; Chassis BD, Combination Sets
	Knob	KN3882	(FM-AM-Ph-TV)-Mahogany, FM-AM Combination Sets
	Knob	KN3882-1	(FM-AM-Ph-TV)-Tan, FM-AM Combination Sets
	Mask	PP3646-1	Models T21BD19, C21BD35
	Mask	PP3646-2	Models K21BD34, T21BF20, C21BF21
	Safety Glass	PP3656	Chassis BD
	Safety Glass	PP3656-1	Chassis BF



TUNER PART NO. CL-3865, USED IN CHASSIS BF

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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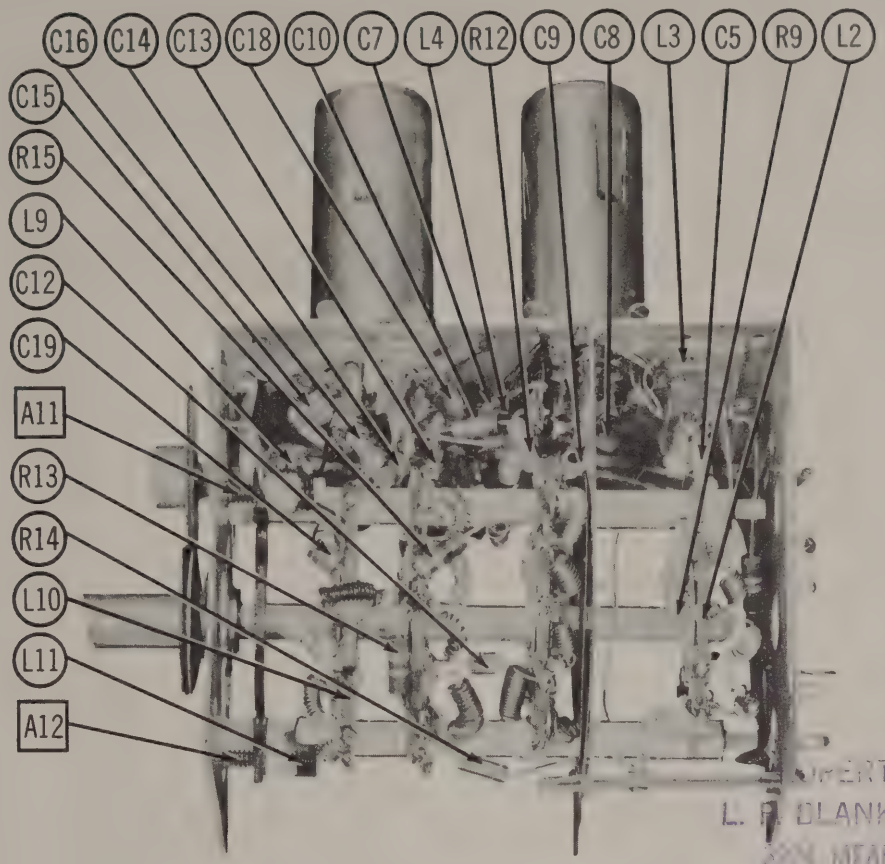
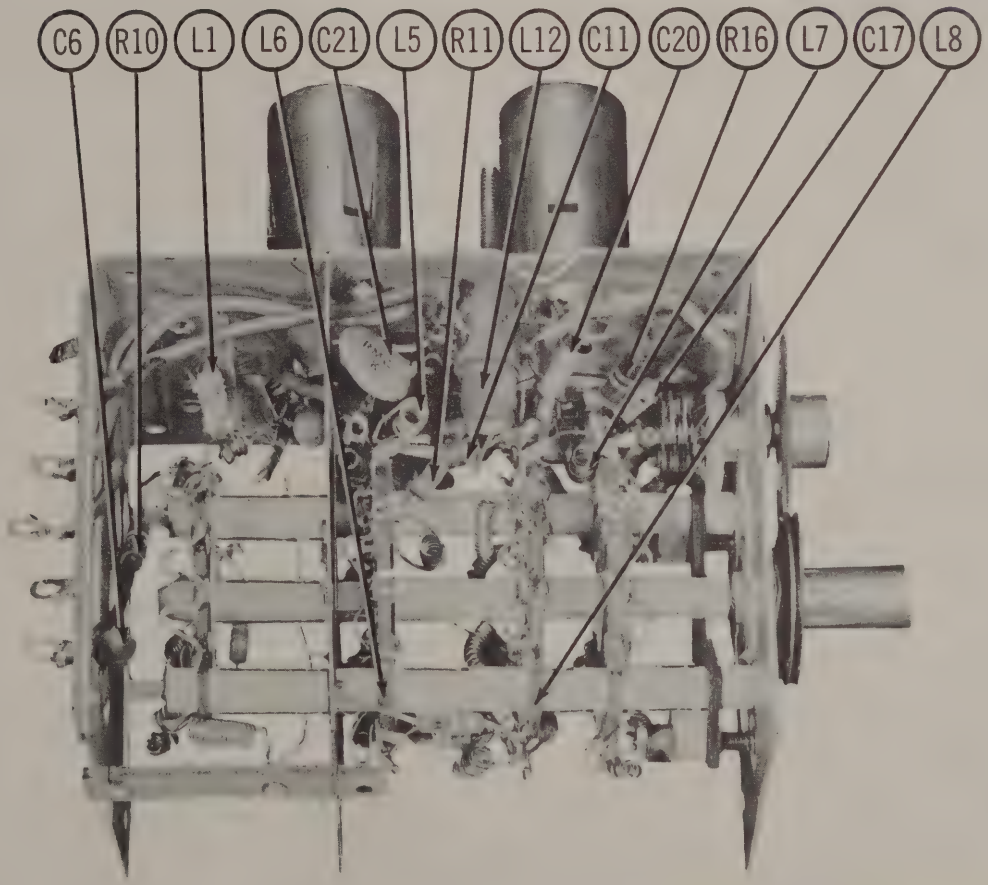
ALTERNATE TUNER SCHEMATIC

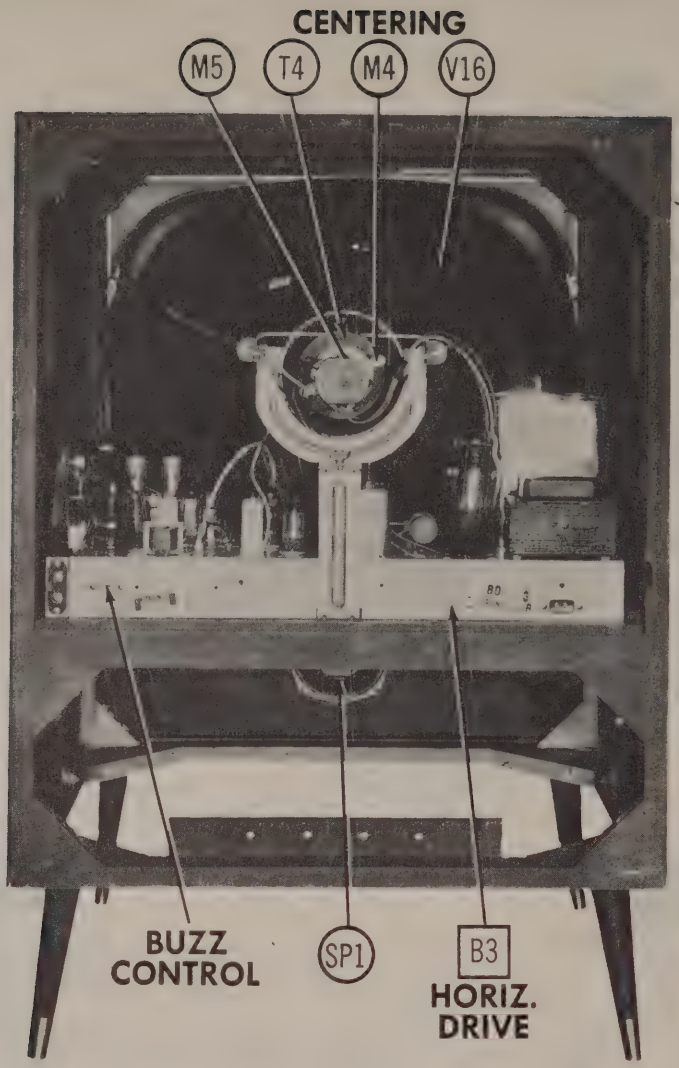


PERTY OF
L. F. BLANKENSHIP
MEADE ST.
DENVER, COLORADO

RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Connect a jumper across terminals "C" and "D" of L26. Set the horizontal hold control fully clockwise. Adjust the horizontal frequency slug (B1) until the picture falls into sync.

Remove the jumper from terminals "C" and "D" of L26. Connect the high side of the vertical amplifier of the scope to terminal "C" of L26 thru a 5MMF capacitor.

Adjust the horizontal phasing slug (B2) for a waveform similar to Fig. 6 with broad and narrow peaks of equal height.

If necessary, during the adjustment of B2, keep picture in sync with the horizontal hold control or B1.

Remove scope and retouch B1 for the following conditions.

1. At fully clockwise position of the horizontal hold control a blanking bar or picture jitter should be evident.

2. At full counter clockwise position of horizontal hold control, picture should be at the point of losing sync.

Adjust the horizontal drive trimmer (B3) clockwise as far as possible without the presence of vertical white lines or compression of the picture.

If neither of these conditions occur, adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally.

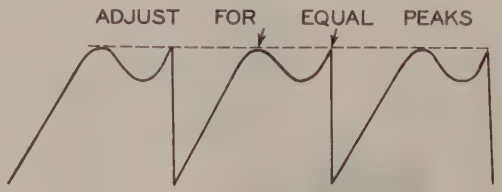


FIG. 6

PROPERTY OF
L. F. BLANKENSHIP
[illegible] MEAD ST.
BROWN, COLORADO

SILVERTONE MODELS 3070 (Ch. 567.240 & Amp. Ch. 567.35001), 4070 (Ch. 567.34001 & Amp. Ch. 567.35001), 6070 (Ch. 567.34002 & Amp. Ch. 567.35006)

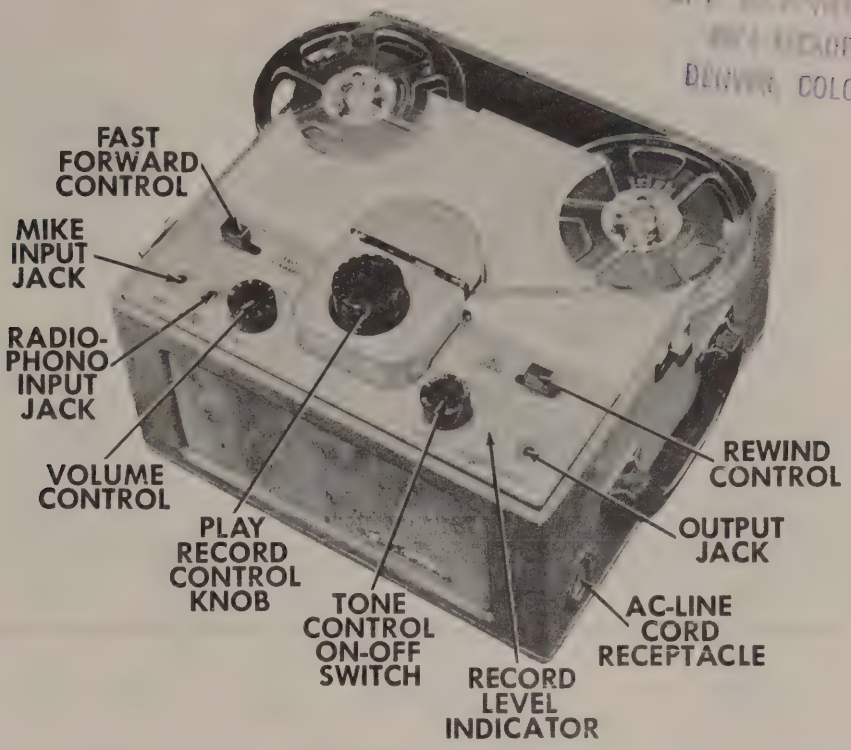


Figure 1

GENERAL INFORMATION

The Silvertone Models 3070, 4070 and 6070 are designed for one speed operation. Models 3070, 4070 and 6070 record and play back at a constant speed of 3 3/4" per second. The major difference between the models is in the amplifier used. The model 6070 has a 12AU7A for the pre-amplifier where the models 3070 and 4070 have a 5879 pre-amplifier. Notice the difference in the schematic located toward the rear of this manual.

Models 3070, 4070 and 6070 are designed to record and playback two tracks of material on standard width recording tape, which doubles the recording and playing time with no loss of frequency response or quality. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone.

Models 3070, 4070 and 6070 have a speed of 3 3/4" per second. Using both tracks, the recording time is as follows:

Size Reel	3/4" Speed
5"	1 hour
7"	2 hours

Models 3070, 4070 and 6070 are designed to operate on 60 cycles, 110-120 volts, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Supplied by:

Sears, Roebuck & Co.
925 S. Homan Street
Chicago 7, Illinois

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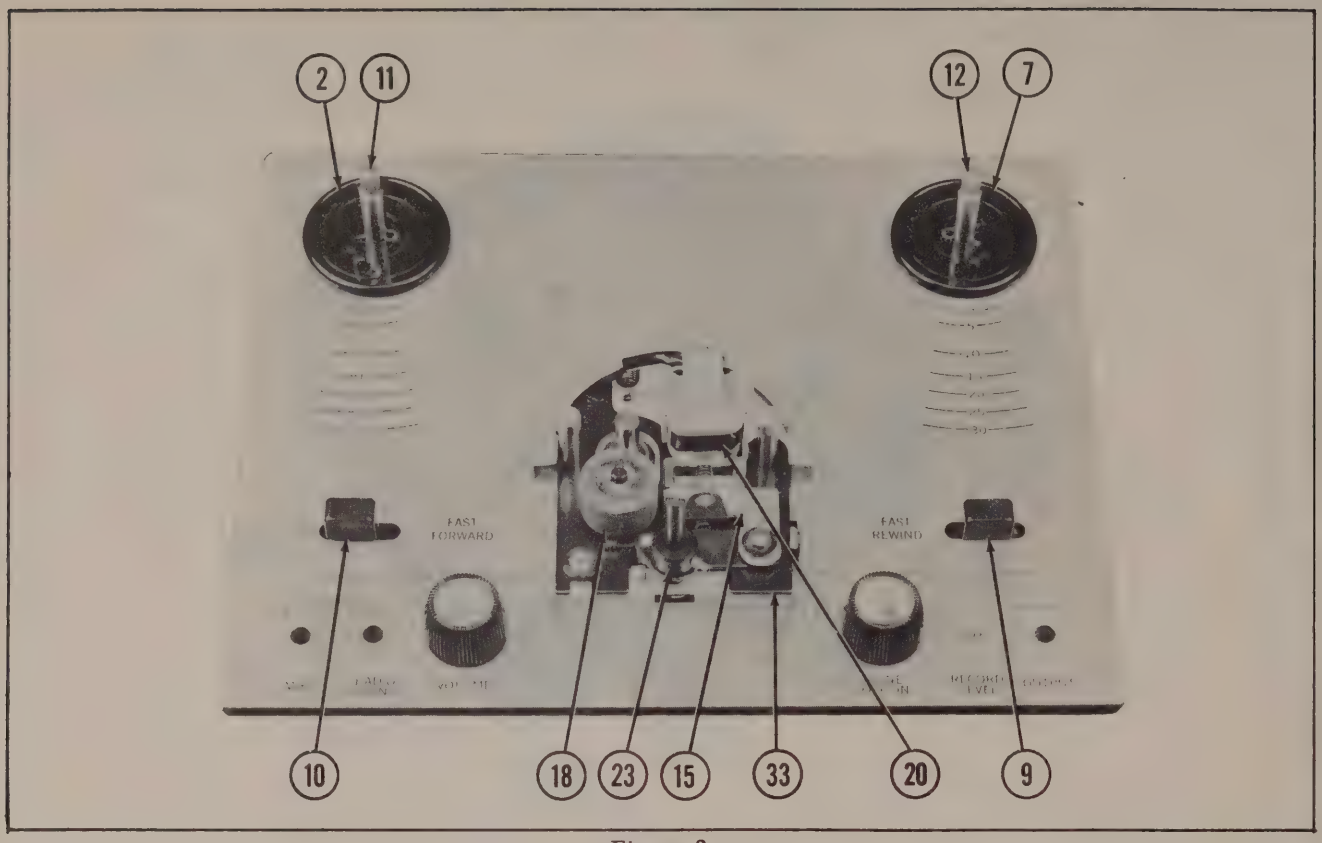

Figure 2

SPECIFICATIONS

Fast Forward Speed-

5" reel, 45 seconds.
7" reel, 90 seconds.

Fast Rewind Speed-

5" reel, 45 seconds.
7" reel, 90 seconds.

Frequency Response-

3 3/4" speed, 65 to 6000 cycles per sec.
7 1/2" speed, 65 to 8500 cycles per sec.

Power Output-

2 watts undistorted
3 watts maximum

Inputs-

Microphone, 1 Meg. Impedance
Radio-Phono, .5 Meg. Impedance.

Outputs-

Internal 5" Speaker.
External 3.2 Ohm Speaker.
External high impedance output for Ext. Amp. or Monitor in Record or Playback position.
External-Low impedance across 3.2 Ohm voice coil for Ext. Spkr.

Bias & Erase Frequency-

50 K.C.

OPERATING INSTRUCTIONS

1. With the On-Off Tone Control in the "Off" position, insert the AC power cord into the receptacle on the right side of the cabinet (Figure 1).

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

Threading The Tape-

1. Place a reel of tape on the right reel plate (7) and an empty reel on the left reel plate (2) making sure the reel slots engage the pins on the reel plates.

2. Unwind about 10" of tape from the reel. Hold a section of the tape straight with both hands and insert the tape in the tape slot making sure the dull coated side faces the rear of the recorder.

3. Insert the free end of the tape into one of the three radial slots in the hub of the empty reel. Turn the reel several turns, clockwise, until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Turn the On-Off Tone Control clockwise until a click is heard and allow about thirty seconds for the tubes to warm up.

2. Insert the microphone plug into the "Mike" jack.

3. Depress the play-record control knob (4) as far as it will go, turn clockwise until it locks while holding it down.

4. Hold the microphone about six inches from your mouth and speak in a normal voice. Adjust the

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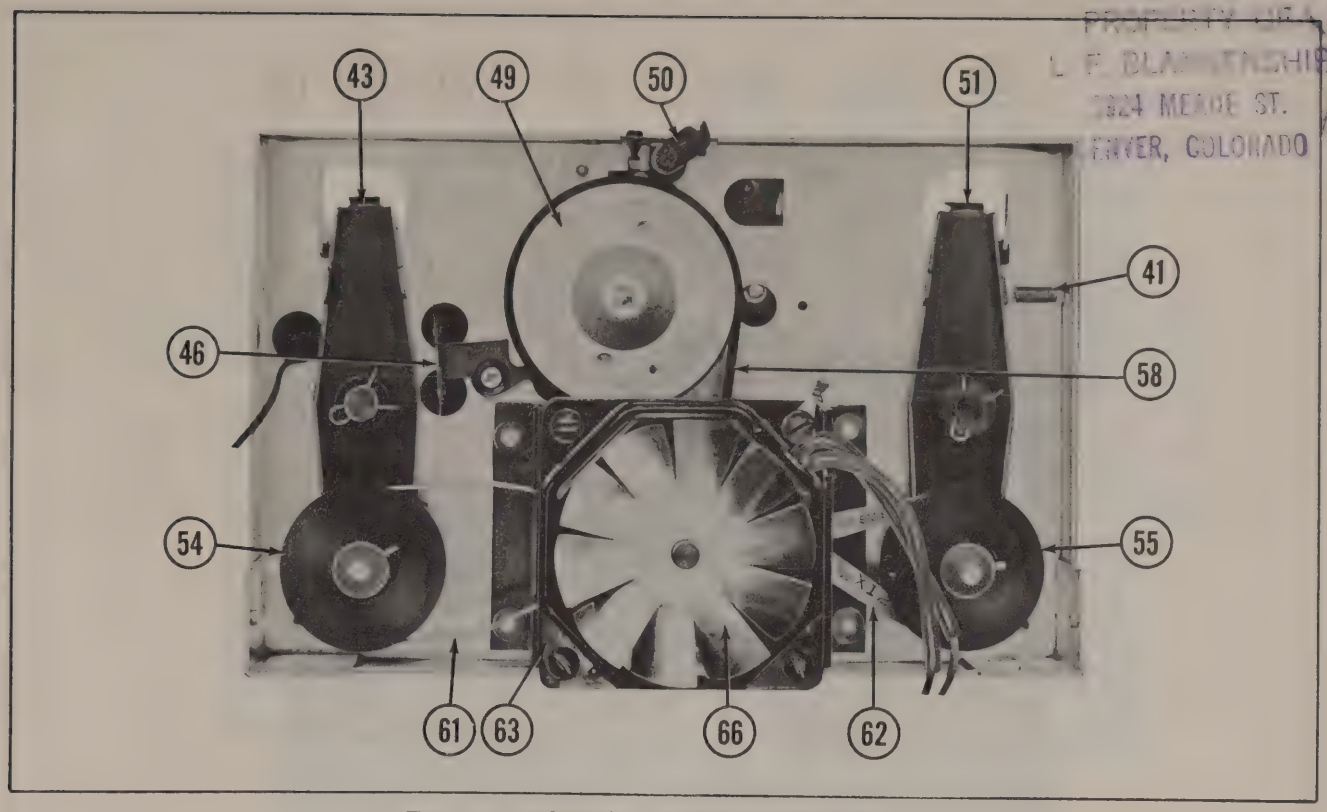

Figure 3 Models-4070 And 6070 Mechanism

"Volume" control until the record level indicator flashes on the loudest sounds.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the record level indicator to flash, will result in weak playback and high background noise. Too strong a signal, causing the level indicator to flash continuously, will result in distortion during playback.

To Record From Radio-

Recordings from a radio may be made by one of three ways:

1. Place the microphone about 6" to 12" in front of the radio speaker. Turn the radio volume control to a normal level. Setting it too high will cause distortion. Turn the radio tone control to maximum treble. Set the recording level and proceed with recording as described under "To Record From Microphone". This type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape.

2. Have a shielded cable made up with a two conductor phone plug on one end and two alligator clips on the other end. Connect the alligator clips across the voice coil terminals on the radio speaker and insert the cord plug into the "Radio-Phono" jack. Set the radio volume and tone controls as described above. Set the recording level and proceed as described under "To Record From Microphone".

3. Have a shielded cable with a two conductor phone plug on one end and the other end connected across the radio volume control. Insert the phone plug into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone". The position of the radio volume and tone controls has no effect on this set up and may be set anywhere.

To Record From Phonograph-

1. If the phonograph being used has a phone type plug on the pickup leads, insert it into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone".

2. If the phonograph has a standard pin type plug which is more common, an adaptor is needed. Insert the pin plug into the adaptor and plug the adaptor into the "Radio-Phono" jack.

IMPORTANT: The recorder will not record from microphone or play back while a plug is inserted in the "Radio-Phono" jack.

To Record From Television Receiver-

1. Use one of the three methods described under "To Record From Radio" and proceed with the recording as described under "To Record From Microphone".

Dual Track Recording-

The Silvertone is designed so that only one-half the tape width is recorded at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all of the tape wound on to the take-up reel, turn the play-record control (4) to idle.

2. Remove the reels from the recorder, turning the full reel over and placing it on the right reel plate (7) and the empty reel on the left reel plate (2).

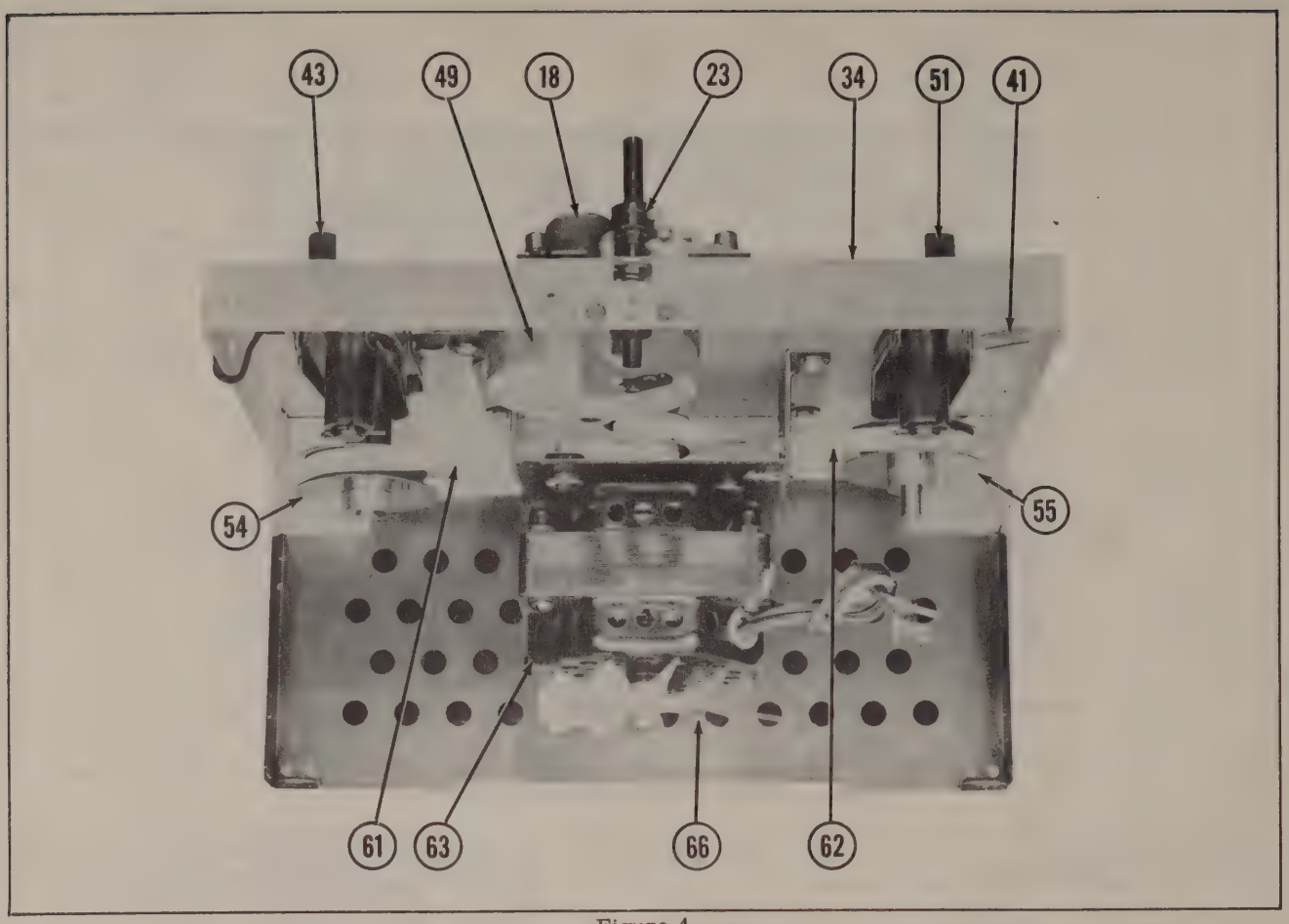

Figure 4

3. Properly thread the tape and proceed with the recording.

4. After this track has been recorded the first track of recording is ready to be played without rewinding, by reversing the reels as described in step 2 above.

Fast Forward And Fast Rewind-

High-speed forward or reverse can be obtained by pressing the desired knob (9 or 10) toward the head cover. Movement of these controls will wind the tape on the desired reel at a high speed as long as the control is held in this position These are used primarily in locating a desired portion of a recording in a few seconds.

CAUTION: Do not attempt "Fast Forward" or "Fast Rewind" with the play-record control (4) on anything but idle position, as damage to the unit or breaking of the tape may result.

Braking-

The Silvertone is equipped with a quick stop when in high speed, either direction. Move both "Fast Forward" and "Fast Rewind" controls toward the head cover and then release both at the same time. For example: when in fast forward speed, continue to hold control and with the other hand move "Fast Rewind" control toward head cover. When machine stops, release both controls at the same time. If a coasting stop is desired, release control in motion and tape will glide to a momentum stop.

To Play A Recording-

1. Thread tape as described under "Threading the Tape".

2. Turn play-record control (4) clockwise without depressing until it locks.

3. Adjust the "Volume" and "Tone" controls for desired listening level.

To Use An Ext. Speaker-

Plug external speaker thru a three conductor plug into "Output Jack".

CAUTION: Do not insert plug into recorder without ext. speaker attached.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

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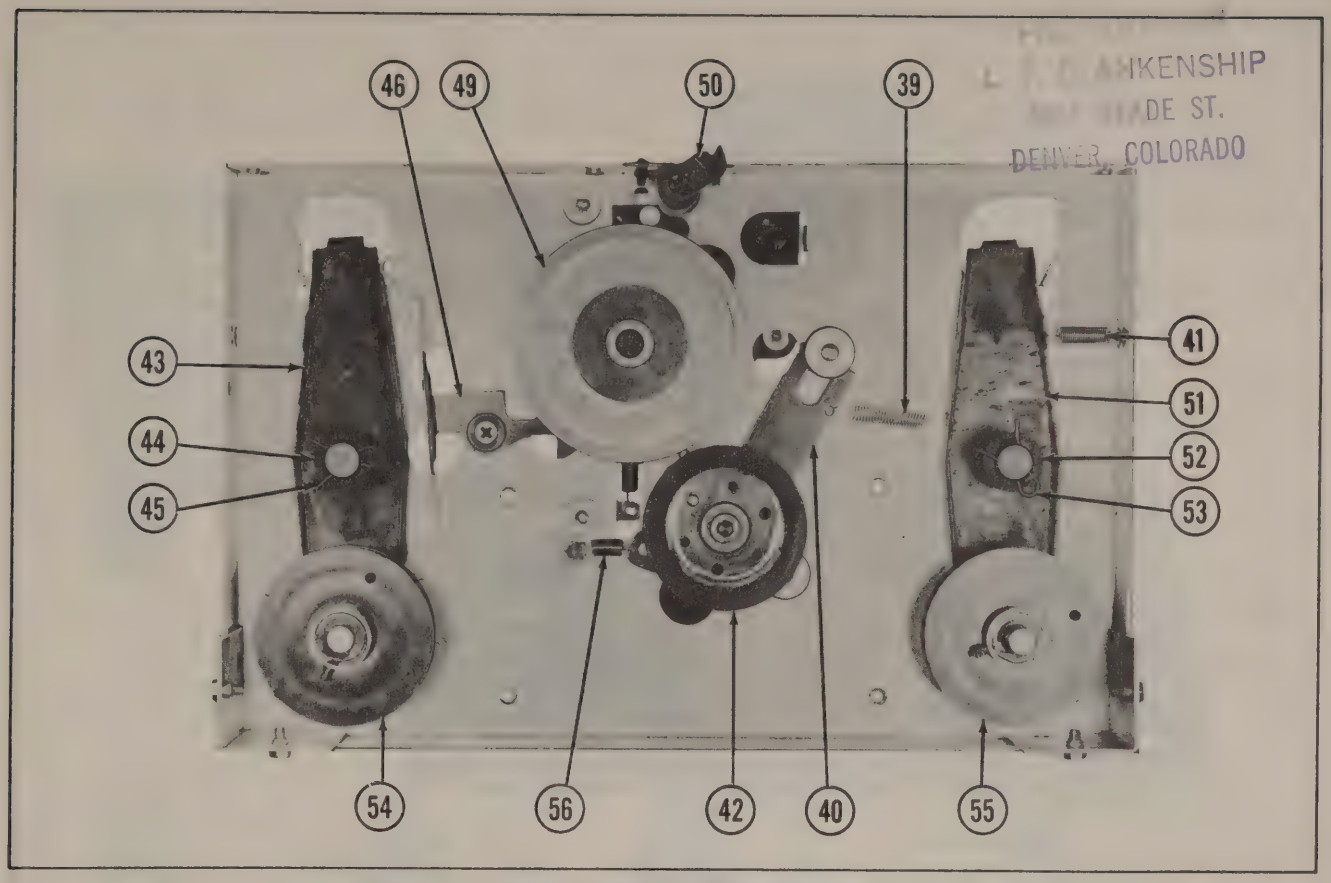

Figure 5 Model-3070 Mechanism

Erasing Recorded Material-

In the record position any recording on the tape is automatically erased before a new recording is put on the tape. If it is desired to erase a recording without putting anything on the tape follow the normal recording procedure, but leave the "Volume" control set at its extreme counterclockwise position.

To Use As A Public Address System-

1. Insert the microphone plug into the "Radio-Phono" jack.

2. Leave the play-record control (4) in idle position.

3. Speak into the microphone and adjust the "Volume" and "Tone" controls for desired level.

4. Do not have the microphone too close to the speaker or a feedback howl will result.

ADJUSTMENTS

Removing Unit From Case-

All service work except cleaning of the head and pressure roller and adjustment of the head and pressure pad assembly requires removal of the unit from the carrying case.

1. To remove unit from carrying case, disconnect power cord and remove the four Phillips head screws from bottom of case and carefully lift unit straight up and out.

Spindle (11 and 12) End Play Adjustments-

The spindles should have from 1/32" to 1/16" of up and down movement. Loosen the set screw in the pulley (54 or 55) and move the pulley up or down until the correct amount of end play is obtained.

Take Up Spring (46) Adjustment-

Place a full 7" reel of tape on the take up reel plate (2). Rewind on the feed reel for about 10 seconds. Place the unit in the "Play" position. The take up reel should start revolving at the same time or a little after the capstan and pressure roller (18) start pulling tape. There should be no looping of the tape before it starts to take up. If the tape loops or doesn't take up at all, bend the take up lever spring (46) at point "A" on exploded view until the recorder takes up properly. Bending the spring outward will increase the take up while bending inward will decrease it.

CAUTION: Do not bend spring (46) to give too much take up or the tape will start to go into fast forward before the pressure roller reaches the capstan.

Take Up Reel Seat (2) And Feed Reel Seat (7) Drag Adjustment-

When the play-record control (4) is released, the reels should stop right away to prevent looping of the tape. Also when in fast forward or rewind and the control is released the reels should coast to a stop without looping the tape. The stop arms on the motorboard (point "B" on exploded view) that the take up and feed reel arms (43 and 51) rest against when the tape is not moving are what govern this. The stop arms should be bent to force the take up reel arm (43) and the feed reel arm (51) over far enough to take up enough belt tension so that the spindles just start to revolve without the reels in place. The play-record control (4) should be in its extreme counterclockwise position when making this adjustment. With the reels in place the spindles should not

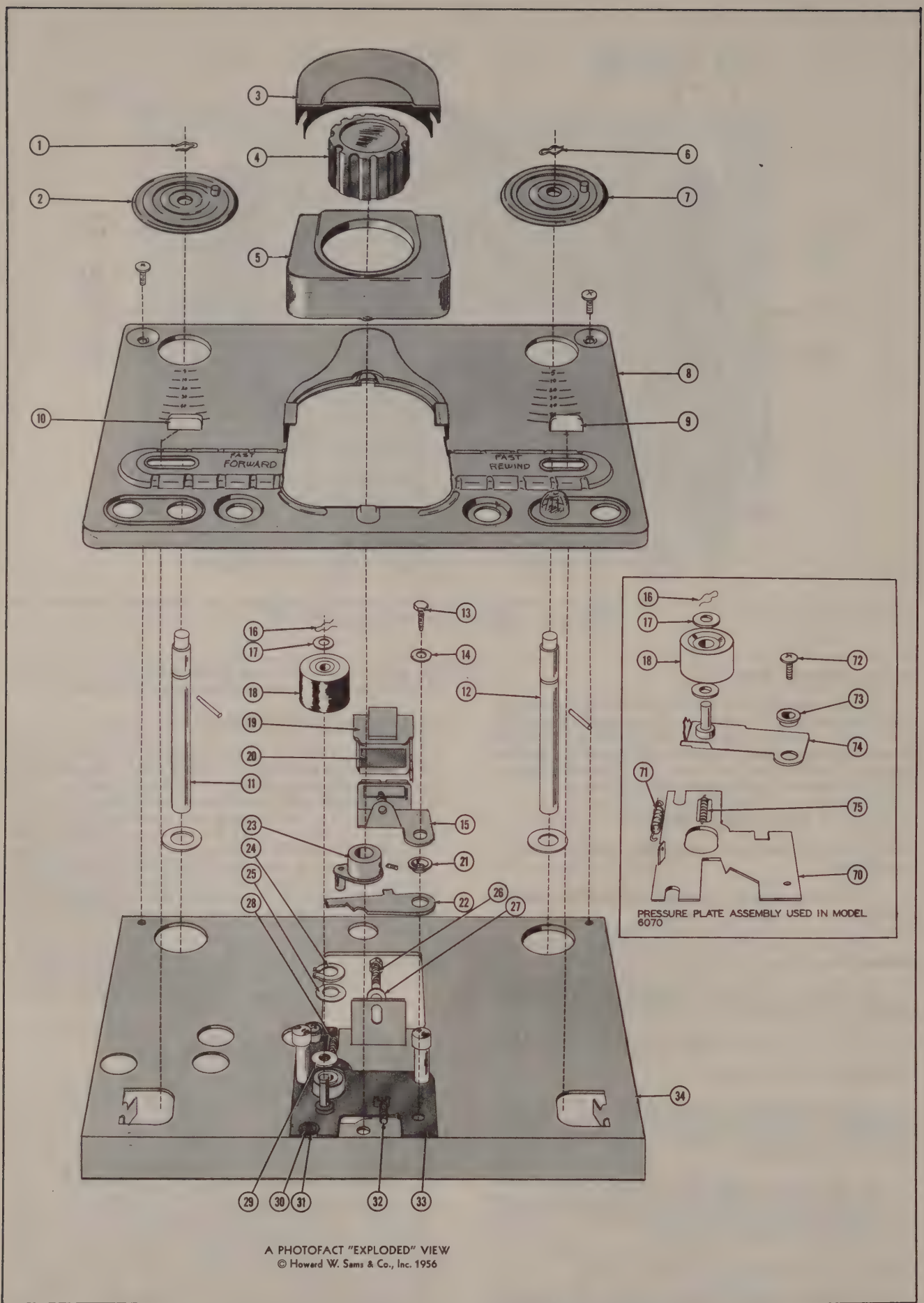

Figure 6A. Exploded View of Parts Above Baseplate.

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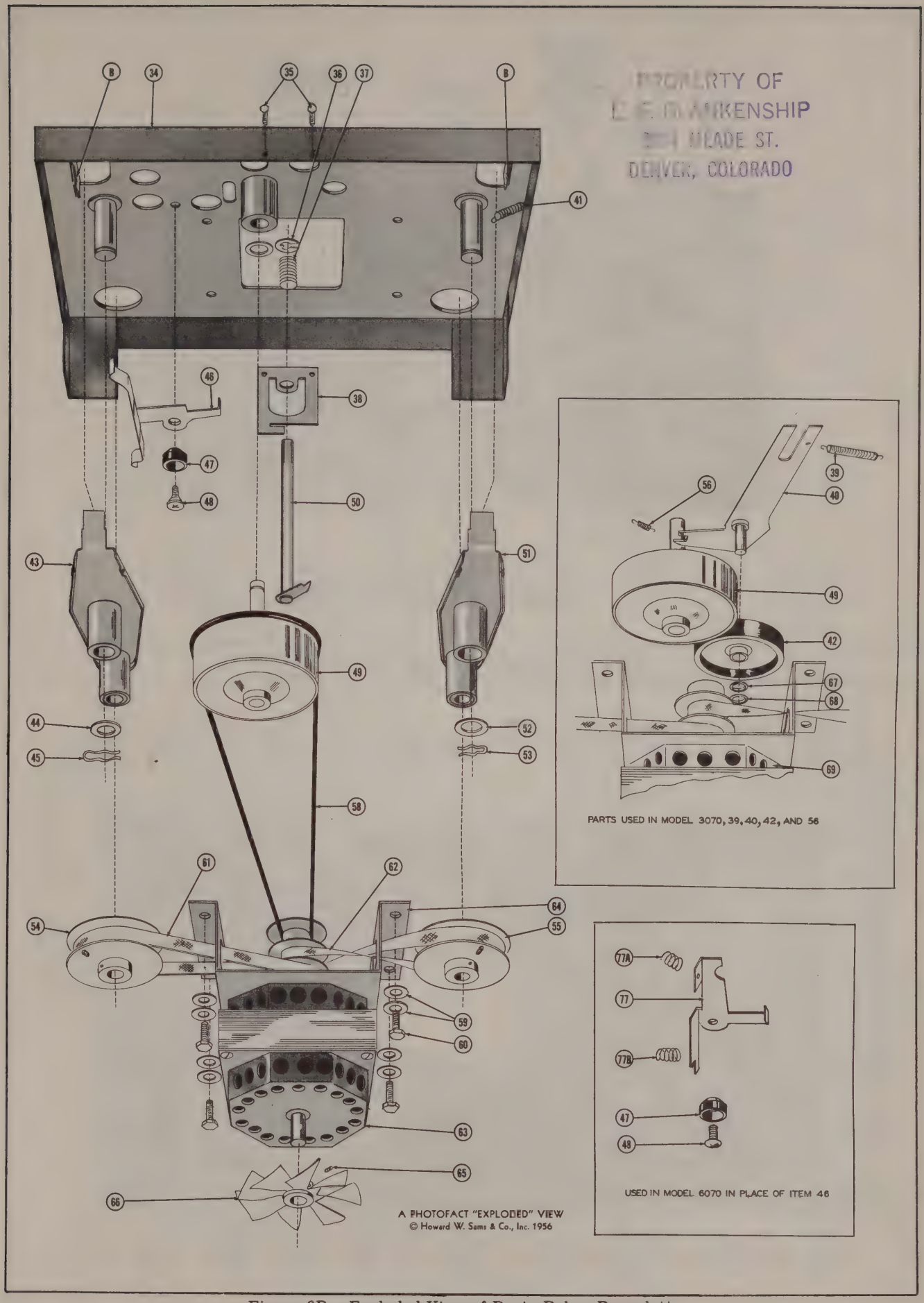
PARTS USED IN MODEL 3070, 39, 40, 42, AND 56
USED IN MODEL 6070 IN PLACE OF ITEM 46
A PHOTOFACT "EXPLODED" VIEW
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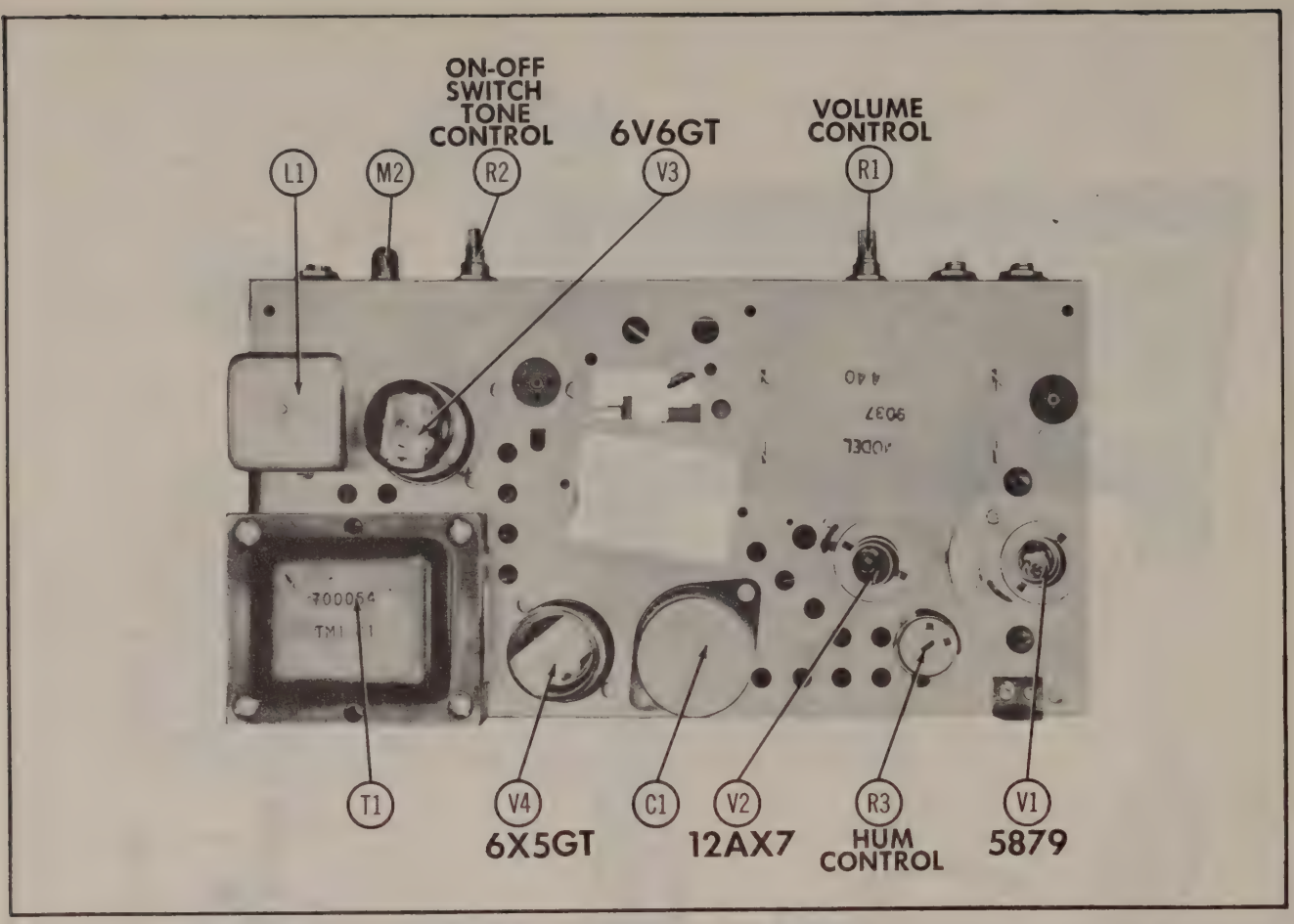
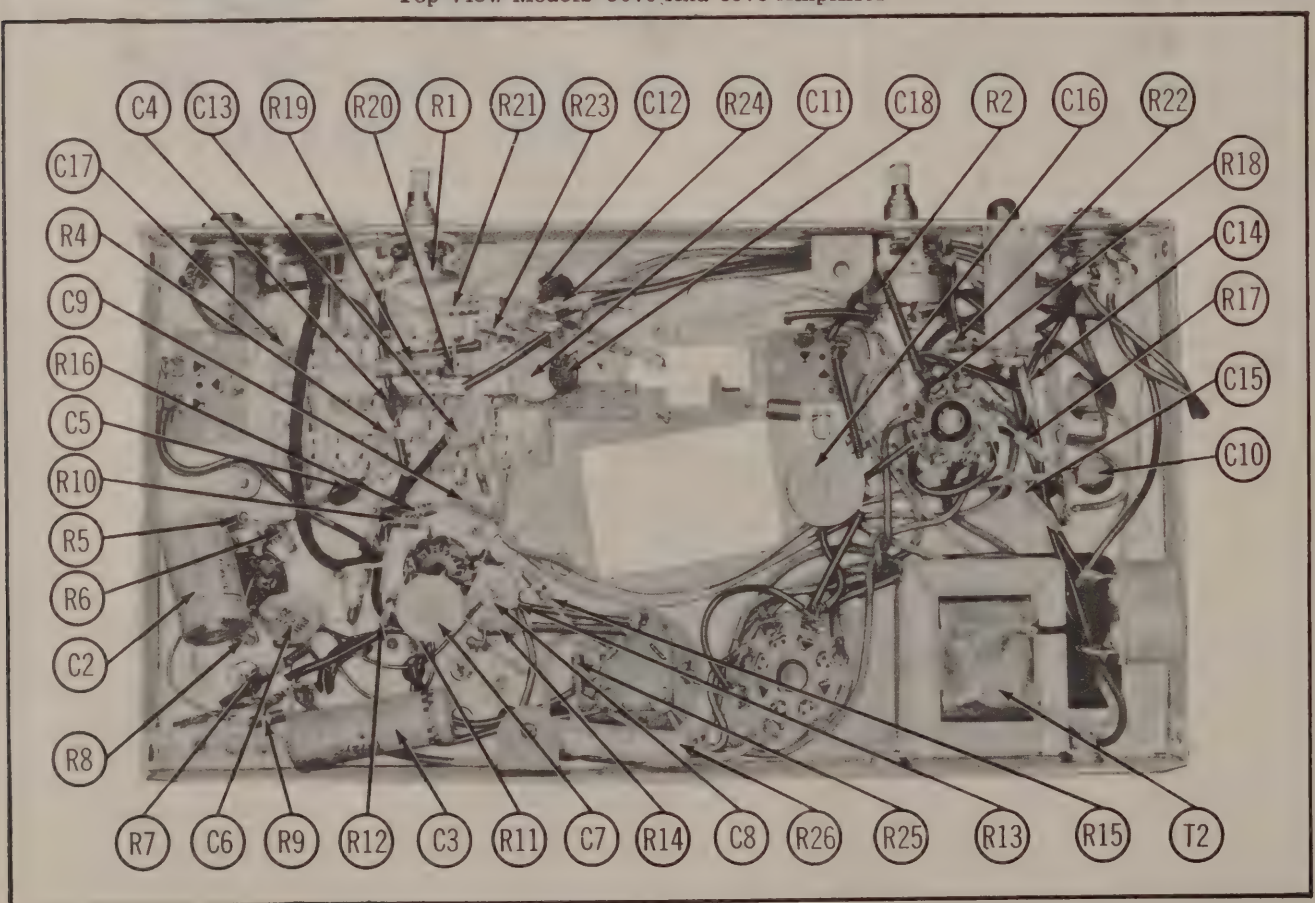
Figure 6B. Exploded View of Parts Below Baseplate.



Top View Models-3070 And 4070 Amplifier



Bottom View Models-3070 And 4070 Amplifier

SILVERTONE MODELS 3070 (Ch. 567.240 & Amp. Ch. 567.35001), 4070 (Ch. 567.34001 & Amp. Ch. 567.35001), 6070 (Ch. 567.34002 & Amp. Ch. 567.35006)

310-12
12AU7A PRE-AMP USED IN MODEL 6070
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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revolve. If one or the other does, force the stop arm (point "B" on exploded view) over until it stops revolving.

Lifter Arm (23) Adjustment-

This adjusts the distance that the contact strip on the play-record switch will move when going into the record position. If an adjustment is necessary, depress and turn the play-record control (4) clockwise. Loosen the set screw in the lifter arm (23) and rotate control knob (4) to the left or right to center the contact strip with the contacts on the left end of the switch. Make sure lifter arm (23) is down as far as it will go and tighten its set screw.

Play-Record-Erase Head Adjustment-

It is very important that the head be lined up perfectly with the tape. If it is not, low output, loss of high frequencies or track overlap may result. If the head is to be replaced, the complete assembly of the head and the bracket (19) that it mounts in should be changed. The bracket is adjusted to the head and sealed in place at the factory. There are two adjustments to be made which are as follows:

1. One is the head height. This is set by placing a .179" gauge (between 11/64" and 3/16") on the motorboard (34) under where the head is mounted. The head is pushed down flush with this gauge and tightened in place and the gauge removed. If a gauge is not obtainable set the head height while the unit is pulling tape. Move the head slowly up until the top edge of the tape is hitting the edge of the tape guides on the motorboard.

2. The second adjustment is for output and frequency response. To set this make a recording of a 3000 cycle signal on a good unit. Place this on the unit that the head is to be aligned on. Connect an output meter or AC voltmeter across the speaker voice coil. Play the 3000 cycle tape, rock the head holder (19) back and forth, screw (26) holding the holder on to the motorboard bracket will allow you to do this, and notice the variation in the output voltage at the voice coil. Tighten the head holder in the position of highest output. Make sure the head was not moved up or down while rocking it. If a 3000 cycle signal tape cannot be made, record a record with some high notes on it on another unit. Play this back on the unit to be adjusted and rock the head to give best high note response.

After setting the height and output check unit for track overlap. To do this take a reel of tape that has no recording on it. Make a recording on the unit that the head has been adjusted on. Do not rewind but take the reels off, reverse them and play the other track. There should be no sound heard. If what was recorded is heard backwards then there is track overlap. If this is the case, the guide on the head holder should be bent up to move the tracks further apart.

Pressure Pad Adjustment-

This applies the correct pressure between the tape and the head. To adjust this, loosen screw (13) that holds pressure pad bracket (15). Turn play-record control (4) clockwise. Move bracket (15) forward until the pressure pad moves back against its spring 1/16". Make sure the front edge of the bracket is parallel with the head and tighten screw (13).

NOTE: When ordering a replacement head, be sure to get the complete assembly of head, plug and bracket. The bracket is adjusted to the individual head and sealed at the factory. Also, when ordering a replacement motor, be sure to get the complete assembly of motor, pulley and plug. The pulley is turned down on the individual motor and is not interchangeable.

Hum Balance Adjustment-

If tube V1 or V2 is replaced or the head changed the setting of the hum balance pot (R3) should be checked. To do this, connect an external speaker to the unit as described under "To Use An External Speaker". Connect an AC voltmeter with a .1 volt AC scale across the speaker voice coil. Turn the "Volume" and "Tone" controls clockwise. Place the play-record control (4) in "Play" position. Put the AC meter on the .1 volt scale and adjust the hum pot. (R3), which is located between tubes V1 and V2 on top of the chassis, to its minimum reading. It should not exceed .1 volt. This is the only adjustment required in the amplifier.

LUBRICATION

The lubricants applied at time of manufacture should be sufficient for a long period of time. Approximately once a year, or in the event that parts are replaced, lubricate the unit as follows:

With No. 20 Motor Oil-

1. Take up reel arm (43) bushing.
2. Feed reel arm (51) bushing.
3. Spindle (11 and 12) bearings.
4. Flywheel (49) bearings.
5. Pressure roller (18) bearing.

With Staput No. 312 grease or lubriplate-

1. Pressure plate (33) at the slide buttons and the guide on the right side.
2. On the stud of the lifter arm (23).

CAUTION: Do not oil the motor bearings unless absolutely necessary as excess oil will only be thrown off and cause slipping of the pulleys and rollers. Always use as little oil as possible. If oil should get on the pulleys and rollers wipe off with a petroleum solvent, such as alcohol. Do not use carbon tetrachloride.

TROUBLES

Won't Take Up Tape Properly-

1. Spindle (11) binding.
   (a) Lubricate.
2. Improper take up spring (46) adjustment.
   (a) See "Take Up Spring Adjustment".
3. Belt (61) slipping.
   (a) Clean motor pulley and pulley (54).
4. Belt (61) broken.
   (a) Remove bracket (64) and replace belt.
5. Set screw loose in pulley (54).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.
6. Pulley (54) broken.
   (a) Replace pulley.

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Fast Forward Won't Function Properly-

1. See above except for step 2.

Fast Rewind Won't Function Properly-

1. Spindle (11 or 12) binding.
   (a) Lubricate.
2. Belt (62) slipping.
   (a) Clean motor pulley and pulley (55).
3. Belt (62) broken.
   (a) Remove bracket (64) and replace belt.
4. Set screw loose in pulley (55).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.
5. Pulley (55) broken.
   (a) Replace pulley.

Speed Variation or Wow-

1. Slippage.
   (a) Clean motor pulley, flywheel and capstan (49) and pressure roller (18) with a petroleum solvent, not carbon tetrachloride. Replace rubber rollers if they appear oil soaked.
2. Too much feed reel drag.
   (a) Check adjustment as described under "Take Up Reel Seat And Feed Reel Seat Drag Adjustment".
3. Flat spot on rubber roller (18).
   (a) A rapid thumping sound while the unit is running may indicate a flat spot on the rubber tire. If this condition does not clear up after several minutes of running time, replace the roller.

   (b) If the surface of the rubber roller is not smooth and even, replace the part.

   (c) Should the bearings of the rollers show signs of excessive wear or be extremely wobbly, the rollers should be replaced.
4. Tight feed or take up spindle (11 or 12)
   (a) Check adjustment as described under "Spindle End Play Adjustment".

   (b) Lubricate.
5. Tight pressure roller (18).
   (a) Lubricate.
6. Tight flywheel shaft (49).
   (a) Lubricate.
7. Pressure pad assembly (15) applying too much pressure against tape.
   (a) Check adjustment as described under "Pressure Pad Adjustment".

Stalling or Binding-

1. Speed control setting changed while unit not turned on. This should be done only when motor is running.

   (a) With motor turned "On", try moving speed control up and down several times.

Should the above fail, try holding the fast forward control (10) to the left as far as it will go and with the other hand manually rotate take-up reel spindle (7). If binding still continues it will be necessary to remove unit from case and free any binding action.

Speed Does Not Agree With Speed Setting-

1. Broken "ears" on motor drive pulley.

   (a) Replace entire motor.

Tape Creeps Out Of Tape Slot-

1. Head (20) improperly adjusted.

   (a) See "Play -Record -Erase Head Adjustment".

CLEANING

The record-playback head (20), capstan shaft and pressure roller (18) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This can cause distortion, weak output and poor erasure. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush or any metallic object when cleaning the record-playback head as this could possibly mar the head surface.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	460112	Spring Retainer		420104	Pressure Pad Spring
2	310144	Reel Plate		011316	Pressure Pad Assembly
3	100672	Head Cover	16	460111	Spring Retainer
4	310147	Mechanism Control Knob	17	580143	Cloth Washer
5	100687	Cover	18	011236	Pressure Roller
6	460112	Spring Retainer	19	100556	Head Holder
7	310144	Reel Plate	20	011312	Play-Record-Erase Head and Plug Assembly
8	011309	Top Plate			
9	310146	Rewind Control Knob	21	200288	Slide Button
10	310146	Fast Forward Control Knob	22	100658	Tension Arm
11	011319	Spindle Assembly	23	011307	Lifter Arm & Set Screw Assembly
12	011319	Spindle Assembly	24	460114	Flywheel Retainer
13	600180	Screw 6-32 x 5/16 Hex. Hd.	25	580141	Flat Washer . 315x. 01
14	580043	Flat Washer . 142 x 5/16 x 1/32	26	600113	Screw 8-32 x 5/16 Hex. Hd.
15	011315	Pressure Pad Bracket Assembly	27	580056	Flat Washer, . 188 x 7/16 x . 032

MECHANICAL PARTS LIST-Con't.

Ref. No.	Part No.	Description
28	420105	Pressure Plate Return Spring
29	580143	Cloth Washer
30	600243	Phillips Flat Hd. M. S. , 6-32 x 1/4
31	200288	Slide Button
32	420110	Tension Arm Spring
33	011314	Pressure Plate & Stud Assembly
34	011309	Motorboard Staking Assembly & Riveting
35	600111	Screw #6-32 x 1/4 Hex. Hd. M. S.
36	460117	Control Shaft Retainer
37	420109	Record Release Spring
38	100660	Position & Shaft Bracket
39	420115	Idler Slide Spring
40	011305	Idler Slide & Stud Assembly
41	420107	Spindle Arm Spring
42	011297	Idler Roller Assembly
43	011329	Take Up Reel Arm Assembly
44	580139	Fibre Washer
45	460110	Hair Pin Clip
46	011328	Take Up Lever & Spring Assembly
47	200288	Slide Button
48	600243	Phillips Flat Hd. M. S. , 6-32 x 1/4
49	011327	Fly Wheel & Shaft Assembly
50	011308	Control Shaft & Lever Assembly
51	011329	Take Up Reel Arm Assembly
52	580139	Fibre Washer
53	460110	Hair Pin Clip
54	011317	Pulley & Set Screw Assembly
55	011317	Pulley & Set Screw Assembly
56	420106	Anti Rattle Spring
58	490087	Rubber Belt
59	580056	Flat Washer, . 188 x 7/16 x . 032
60	600111	#6-32 x 1/4 Hex. Hd. M. S.
61	490053	Take Up Reel Drive Belt
62	490053	Feed Reel Drive Belt
63	011399	Motor Pulley & Plug Assembly
64		Shock Mount & Bracket Assembly
65	600153	Screw, Set 8-32 x 3/16
66	011321	Fan
67	580020	Washer Cloth Graphite Imp.
68	400116	"C" Washer
69	011400	Motor, Pulley & Plug Assembly
70	012327	Pressure Plate Assembly (Inc. 16, 17, 18, 15, 71, 72, 73, 74 & 75 Used in Model 6070)
71	420174	Capstan Pressure Spring
72	600242	Screw, #6-32 x 1/4"
73	200288	Washer, Slide Button Spacer
74	012328	Pressure Roller Arm
75	420171	Spring, Slide Plate Return
76	011692	Motor, 115V. , 60 Cycle (Used in Model 6070)
77	100809	Take-up Lever (Used in Model 6070)
77A	420161	Take-up Spring
77B	420172	Brake Spring, Left

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
V1	730031	5879, Pre-Amp.
V2	730022	12AX7, AF Amp.
V3	730004	6V6GT, Audio Output-Bias Osc.
V4	730005	6X5, Rectifier
C1A		Elect. Cap. , 40 MFD @ 300V.
C1B		Elect. Cap. , 40 MFD @ 300V.
C1C		Elect. Cap. , 40 MFD @ 300V.
C2	770003	Elect. Cap. , 25 MFD @ 25V.
C3		Cap. Molded Paper, . 1MFD @ 400V.
C4	770097	Cap. Ceramic Disc, 75MMF @ 400V.
C5	770090	Cap. Ceramic Disc, 470MMF @ 400V.
C6	770095	Cap. Ceramic Disc, 20000MMF.
C7	770096	Cap. Ceramic Disc, 10000MMF.
C8	770098	Cap. Ceramic Disc, 1500MMF @ 400V.
C9	770095	Cap. Ceramic Disc, 20000MMF.
C10	770090	Cap. Ceramic Disc, 470MMF @ 400V.
C11	770093	Cap. Ceramic Disc, 2000MMF.
C12	770097	Cap. Ceramic Disc, 75MMF @ 400V.
C13	770095	Cap. Ceramic Disc, 20000MMF.
C14	770093	Cap. Ceramic Disc, 2000MMF.
C15	770096	Cap. Ceramic Disc, 10000MMF.
C16	770096	Cap. Ceramic Disc, 10000MMF.
C17	770090	Cap. Ceramic Disc, 470MMF @ 400V.
C18	770090	Cap. Ceramic Disc, 470MMF @ 400V.
R1	740051	Volume Cont. , 500K
R2	740052	Tone Cont. & Sw. , 500K
R3	740053	Hum Cont. , 200Ω W. W.
R4		Resistor, 150K, 1/2 W.
R5	760001	Resistor, 1Meg, 1/2 W.
R6	760025	Resistor, 820Ω, 1/2 W.
R7	760048	Resistor, 390K, 1/2 W.
R8		Resistor, 150K, 1/2 W.
R9	760015	Resistor, 220K, 1/2 W.
R10	760003	Resistor, 1. 5K, 1/2 W.
R11	760052	Resistor, 270K, 1/2 W.
R12	760010	Resistor, 100K, 1/2 W.
R13	760010	Resistor, 100K, 1/2 W.
R14	760047	Resistor, 2. 2K, 1/2 W.
R15	760010	Resistor, 100K, 1/2 W.
R16		Resistor, 68K. 1/2 W.
R17	760013	Resistor, 47K, 1/2 W.
R18		Resistor, 10K, 1/2 W.
R19	760115	Resistor, 270Ω, 1 W.
R20	760054	Resistor, 5. 6Meg, 1/2 W.
R21	760039	Resistor, 560K, 1/2 W.
R22	760040	Resistor, 2. 2Meg, 1/2 W.
R23	760001	Resistor, 1 Meg, 1/2 W.
R24	760037	Resistor, 470K, 1/2 W.
R25	760027	Resistor, 15K, 1/2 W.
R26	760304	Resistor, 1K, 4W.
T1	700054	Power Transformer
T2	700055	Output Transformer
L1	700056	Osc. Coil
M1	011301	Play-Record Switch
M2	730006	Record Level, Lamp, Neon NE51
SP1	011298	PM Speaker 5 1/4"
		Model 6070 has a 12AU7A as the Pre-Amplifier. The parts used with this tube is as follows:
V5		12AU7A Pre-Amp.
C19	770003	Elect. Cap. , 25MFD @ 25V.
C20	770095	Cap. Ceramic Disc, 20000MMF.
C21	770095	Cap. Ceramic Disc, 20000MMF.
R27	760001	Resistor, 1Meg. , 1/2 W.
R28		Resistor, 4. 7K, 1/2 W.
R29	760015	Resistor, 220K, 1/2 W.
R30	760037	Resistor, 470K, 1/2 W.
R31	760037	Resistor, 470K, 1/2 W.
R32		Resistor, 4. 7K, 1/2 W.
R33	760015	Resistor, 220K, 1/2 W.

SILVERTONE MODELS 6020, 6021
(Ch. 132.09000, 132.09001)

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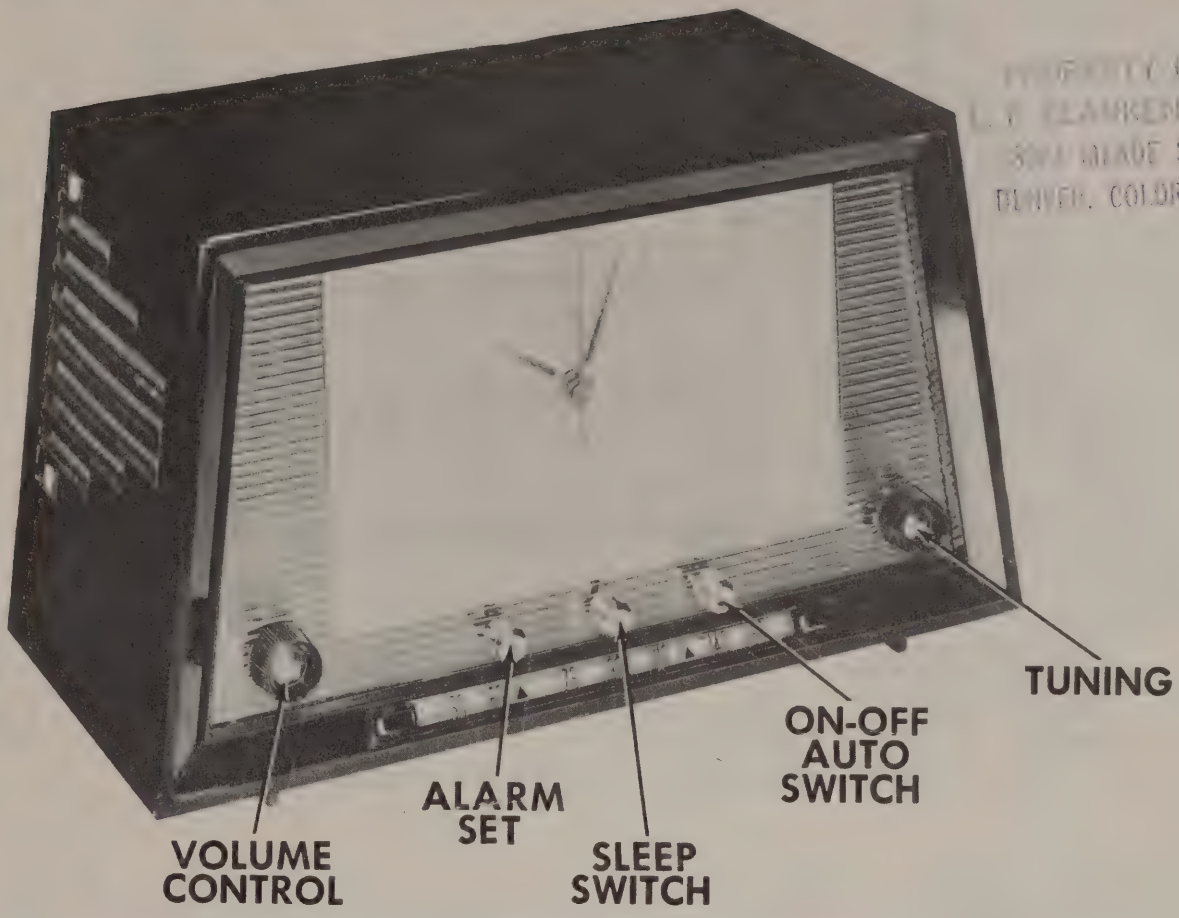

SILVERTONE MODELS 6020, 6021
(Ch. 132.09000, 132.09001)

TRADE NAME	Silvertone Models 6020, 6021 (Ch. 132, 09000, 132. 09001)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC -60 cycles
RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop (Radiate)	1400KC	1400KC	"	A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	600KC	"		Check for calibration & tracking

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PARTS LIST AND DESCRIPTIONS

SILVERTONE
Model 6020

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. -AVC-AF Amp	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	4344	PRS150V50-50	BBRD5515	TCD49	TDL-D50-150	FMD-1550	TVA-2453
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	5			NPO-S15	TCZ-4R7	TZ07	NPOA-050	ZT-555	5TCCB-V47	
C3	.047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C4A	220									
B	5000									
C	5000		♦ 43343	♦ PA-113-1	♦ PC-150	♦ 116TM1	♦ 1408-02		♦ DT-1	
D	250									
E										
C5	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C6	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

♦ Items C4A, C4B, C4C, C4D, C4E, R4A, R4B and R4C are combined in one unit. When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	43314	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22K	½		BTS-22K	
R3	2.2Meg	½		BTS-2.2Meg	
R4A	6.8Meg	½	♦43343	BTS-6.8Meg	
B	470K	½		BTS-470K	
C	470K	½		BTS-470K	

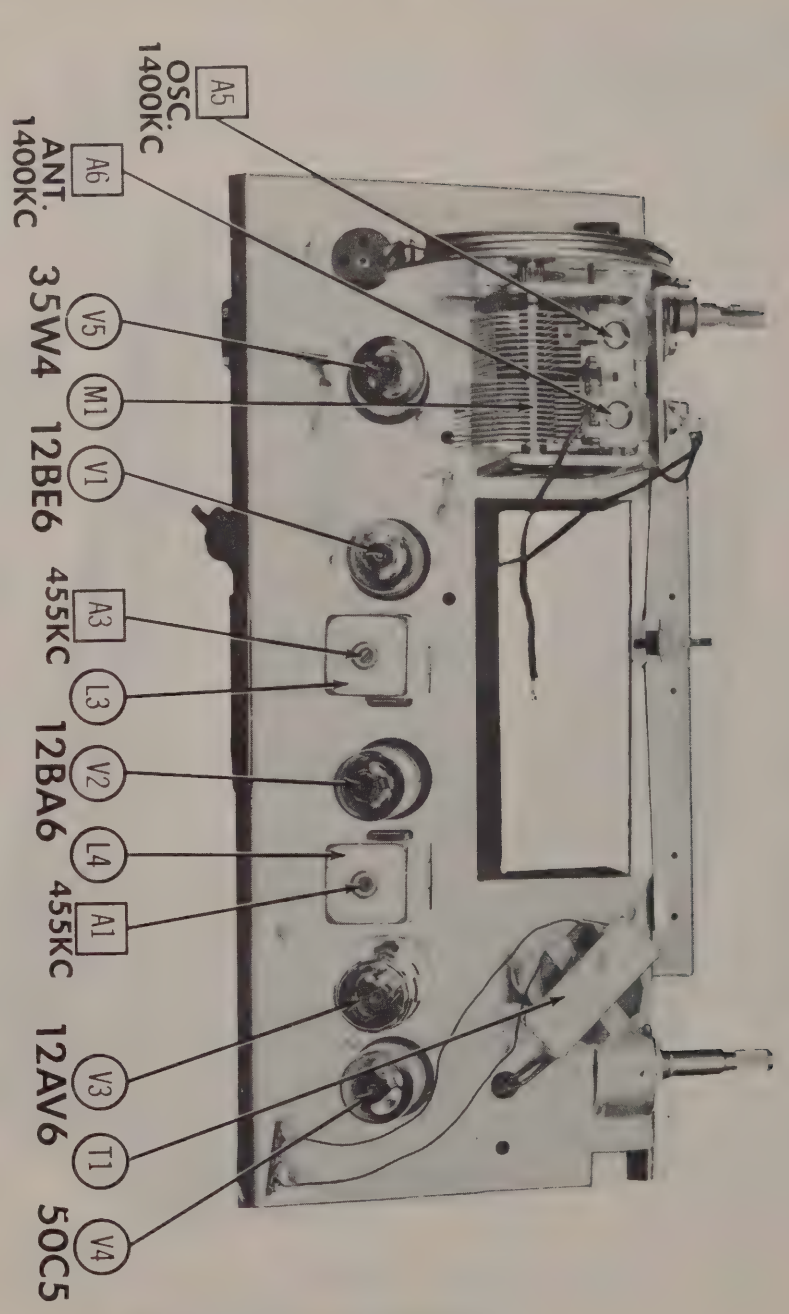
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5	100K	½		BTS-100K	
R6	100Ω	½		BTS-100	
R7	12K	1		BTA-12K	
R8	1K	1		BTA-1K	
R9	330K	½		BTS-330K	

♦ Items R4A, R4B, R4C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.4KΩ	3.2Ω	43700-3	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.2Ω	N43183	4A07	223S1	

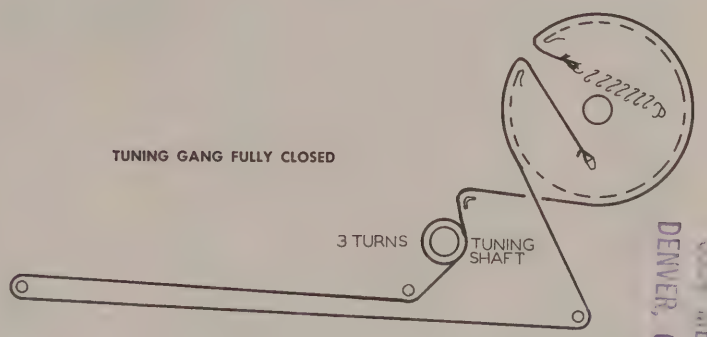
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.8Ω		43318-1				Includes cabinet back- Note 1
L2	Osc. Coil	.7Ω	7.5Ω	41980-1	14-1073 *		69-Osc. ■	Note 2
L3	Input IF	15Ω	15Ω	40845-1	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	40845-1	16-6758	BC-353	12-C2	

Note 1. Part No. 43318-2 used in chassis 132.09001.
Note 2. Part No. 43548-1 used in chassis 132.09001.
* Leads sufficient mounting support.
■ Drill mounting hole.

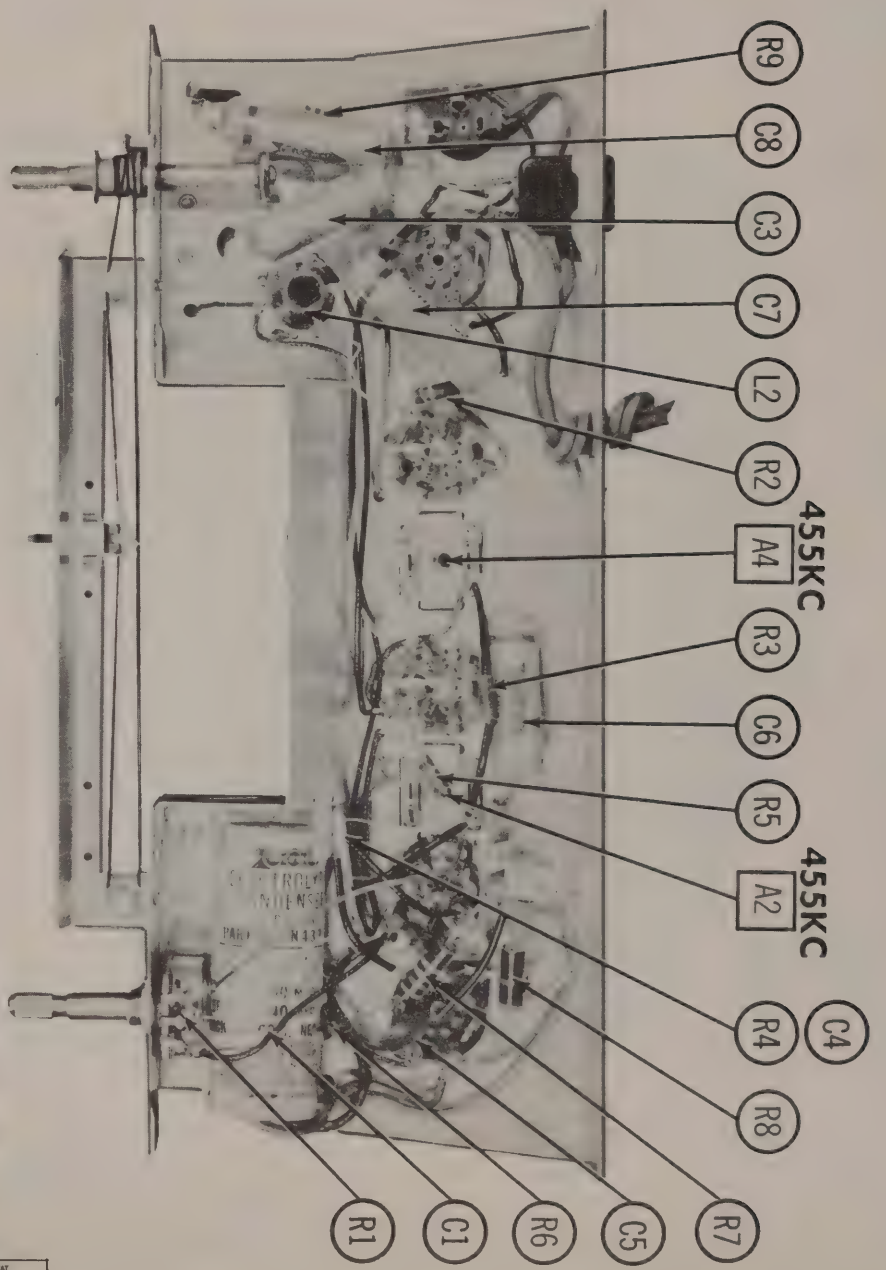
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M1	Tuning Cap.	43180	2 Gang (13-320MMF, 18-135MMF) Ch. 132.09000
	Tuning Cap.	43574	2 Gang Ch. 132.09001
	Cabinet	43324-1	Brown
	Cabinet	43324-2	Ivory
	Knob	41343-1	Volume & Tuning-Brown
	Knob	41343	Volume & Tuning-Ivory
	Knob	43199	Clock (3 used)
	Clock	43326-61	
	Dial Pointer	43202	
	Dial	43260	Radio



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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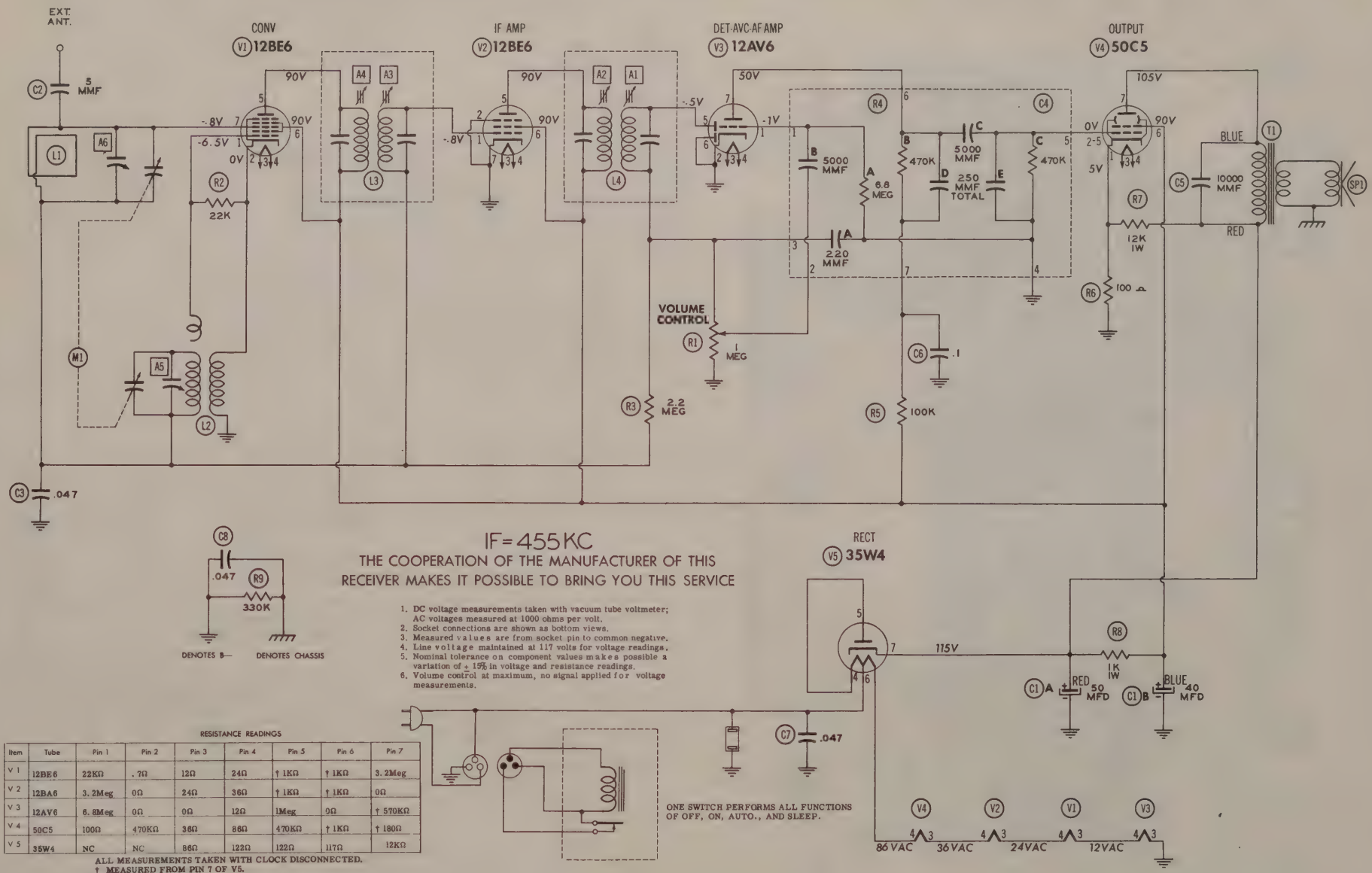
SILVERTONE Model 6020



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	. 7Ω	12Ω	24Ω	† 1KΩ	† 1KΩ	3. 2Meg
V 2	12BA6	3. 2Meg	0Ω	24Ω	36Ω	† 1KΩ	† 1KΩ	0Ω
V 3	12AV6	6. 8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	† 570KΩ
V 4	50C5	100Ω	470KΩ	36Ω	86Ω	470KΩ	† 1KΩ	† 180Ω
V 5	35W4	NC	NC	86Ω	122Ω	122Ω	117Ω	12KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

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PHOTOFACT* Folder

ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)

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ZENITH MODEL X1814R

TRADE NAME	Zenith Models X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING 1.32 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from top panel of cabinet.

2. Remove 8 metal screws. Remove rear cover.

3. Disconnect speaker leads.

4. Remove 4 metal screws holding chassis rails to cabinet (2 metal screws at the top and 2 metal screws at the bottom rear of cabinet.)

5. Slide chassis out the front of cabinet.

6. Remove 2 speaker nuts. Remove speaker.

MODELS	CHASSIS
X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU	16X20, U

ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 push-on type control knobs from front panel of cabinet. Remove 3 metal screws holding 2 knobs trim plates. Remove knob trim plates and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal stabilizer slug (B11) it is necessary to remove the rear cover and supply power to the set. Set the horizontal hold control to its center range position and adjust B1 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control (R8) located on top of chassis for maximum volume and minimum buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

WIDTH CONTROL

The width control is a brass sleeve on the neck of the picture tube and is adjusted by sliding and turning a setting will be found which results in proper width and linearity.

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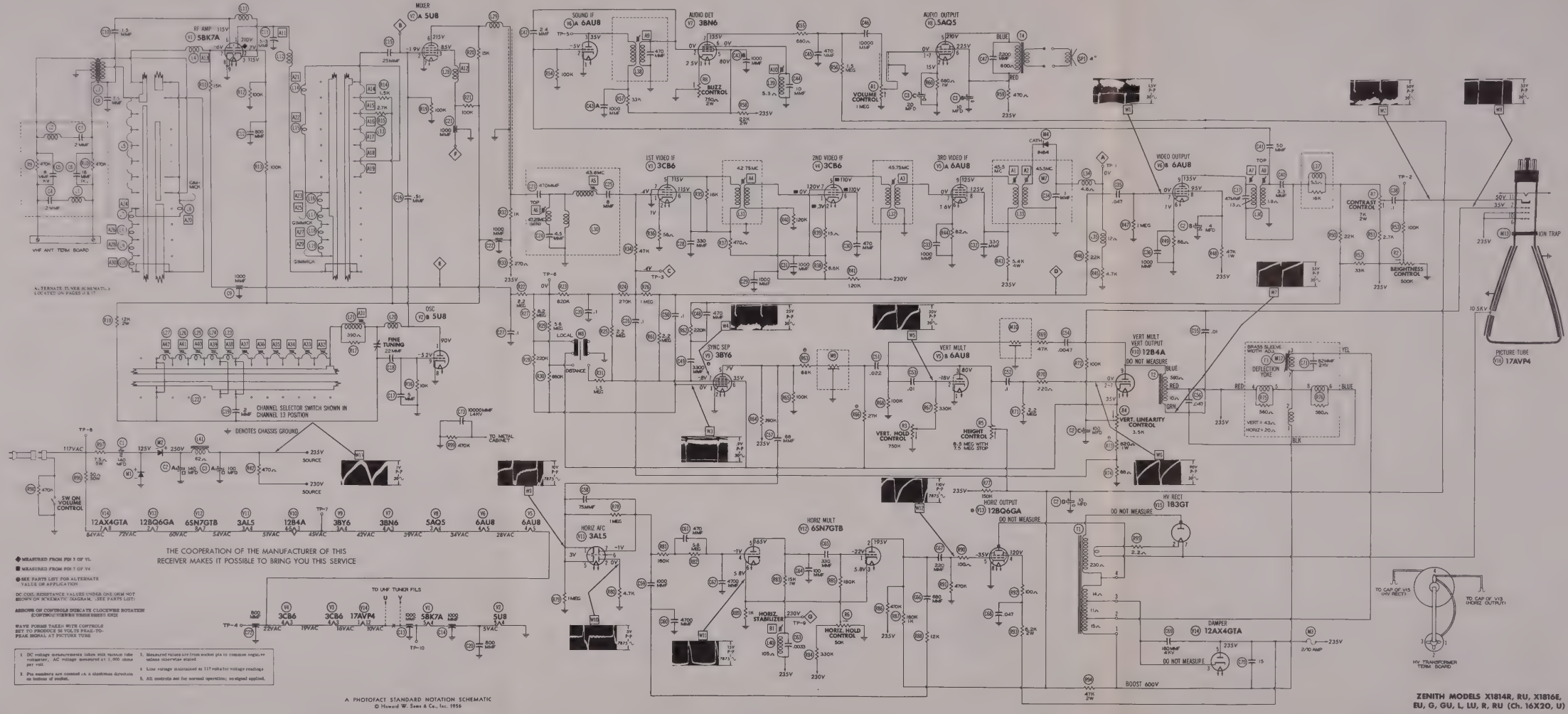
ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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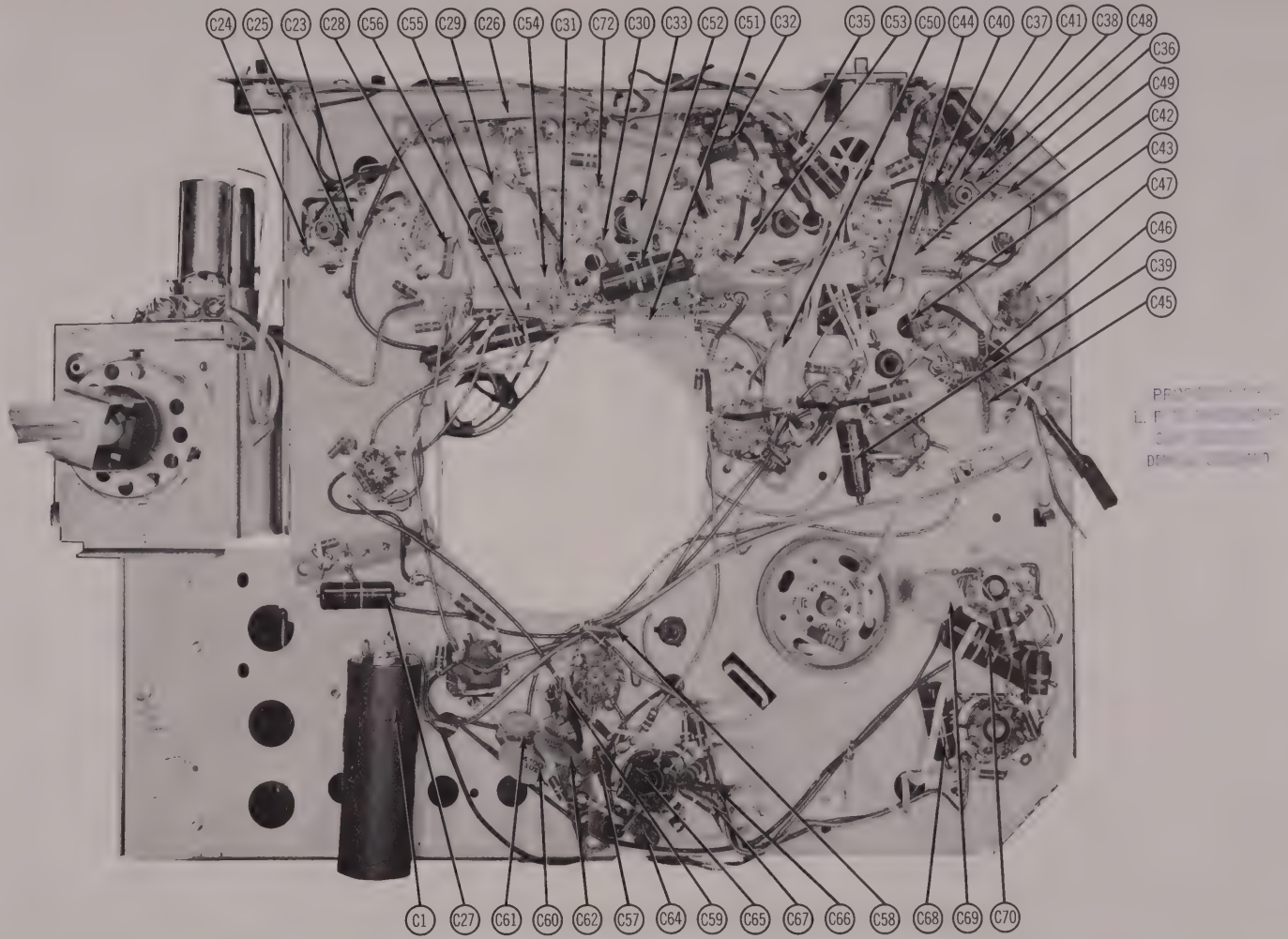
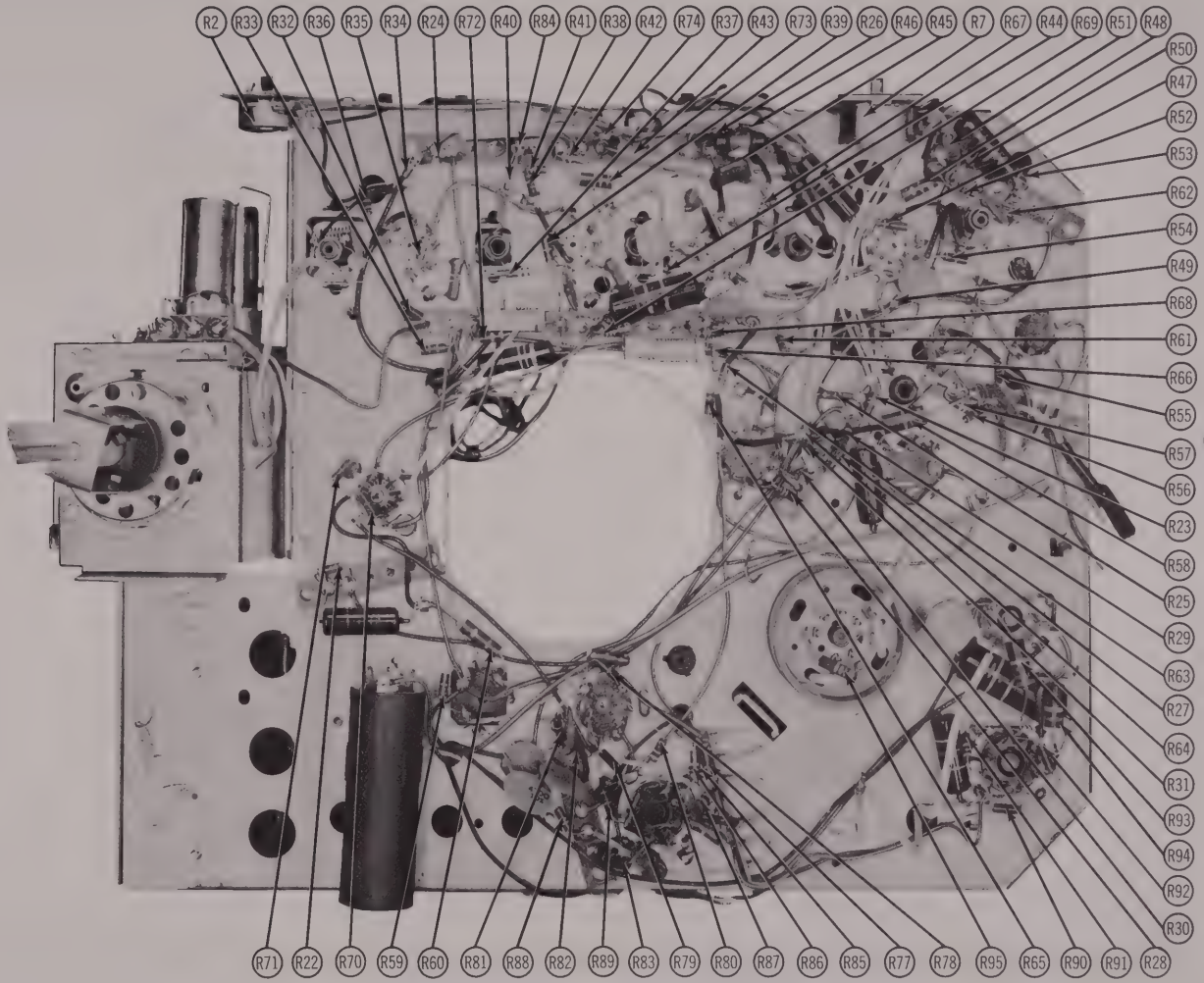
MIXER V7 A 5U8
SOUND IF V6 A 6AU8
AUDIO DET V7 3BN6
AUDIO OUTPUT V8 5AQ5
RF AMP V1 5BK7A
OSC V2 B 5U8
1ST VIDEO IF V3 3CB6
2ND VIDEO IF V4 3CB6
3RD VIDEO IF V5 A 6AU8
VIDEO OUTPUT V6 B 6AU8
SYNC SEP V3 3BY6
VERT MULT V5 B 6AU8
VERT MULT VERT OUTPUT V10 12B4A
HORIZ AFC V11 3AL5
HORIZ MULT V12 6SN7GTB
HORIZ OUTPUT V13 12BQ6GA
HV RECT V15 1B3GT
DAMPER V14 12AX4GTA
PICTURE TUBE V16 17AVP4
VOLUME CONTROL 1 MEG
BUZZ CONTROL 750Ω 2W
FINE TUNING
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
LOCAL
DISTANCE
VERT. HOLD CONTROL 750H
HEIGHT CONTROL 6.8 MEG WITH 7.5 MEG STOP
VERT. LINEARITY CONTROL 3.5H
HORIZ. STABILIZER
HORIZ. HOLD CONTROL 50K
CONTRAST CONTROL 2K 2W
BRIGHTNESS CONTROL 500K
ION TRAP
DEFLECTION YOKE
BOOST 600V
DO NOT MEASURE
TO METAL CABINET
TO UHF TUNER FILS
VHF ANT TERM BOARD
HV TRANSFORMER TERM BOARD
TO CAP OF V15 HV RECT
TO CAP OF V13 (HORIZ. OUTPUT)
SW ON VOLUME CONTROL
117VAC
12AX4GTA 84VAC
12BQ6GA 72VAC
6SN7GTB 60VAC
3AL5 52VAC
12B4A 51VAC
3BY6 45VAC
3BN6 42VAC
5AQ5 39VAC
6AU8 34VAC
5U8 28VAC
3CB6 22VAC
3CB6 19VAC
17AVP4 18VAC
5BK7A 19VAC
5U8 5VAC
235V SOURCE
230V SOURCE
DENOTES CHASSIS GROUND
◆ MEASURED FROM PIN 7 OF V1.
■ MEASURED FROM PIN 7 OF V4
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (COUNTERCLOCKWISE WHERE SHOWN END)
◆AVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied.

ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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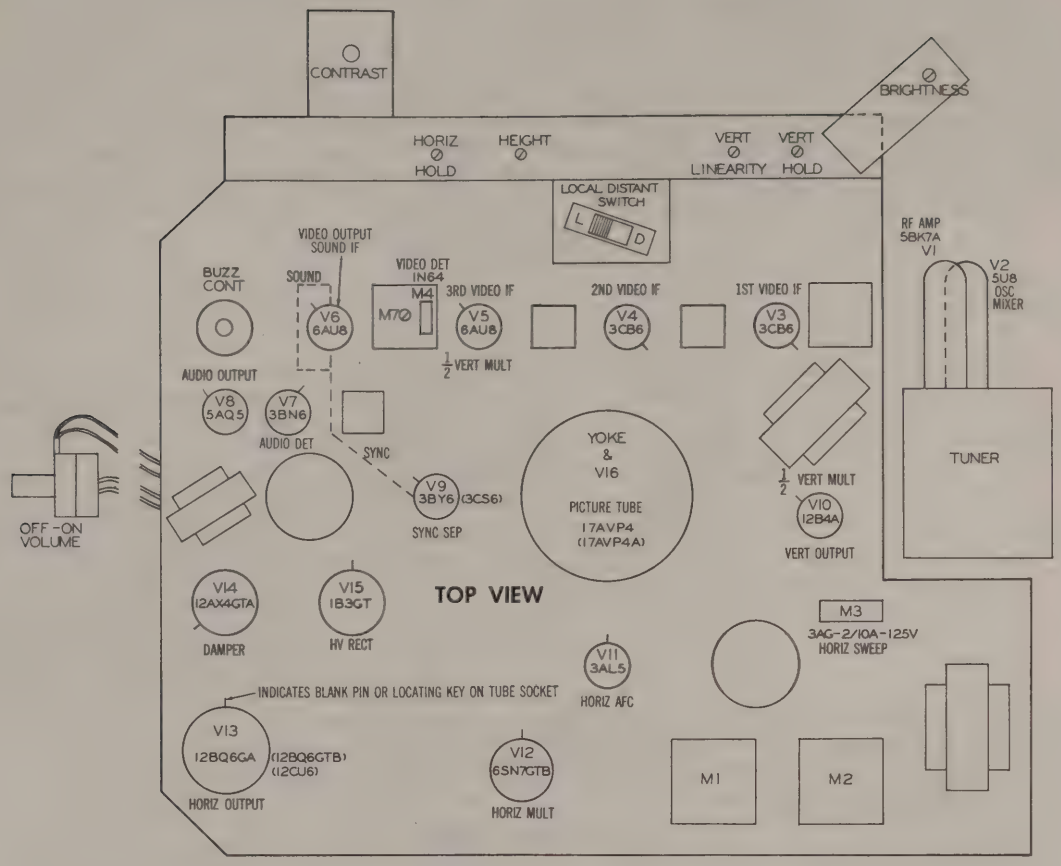
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V6, V7, V8**

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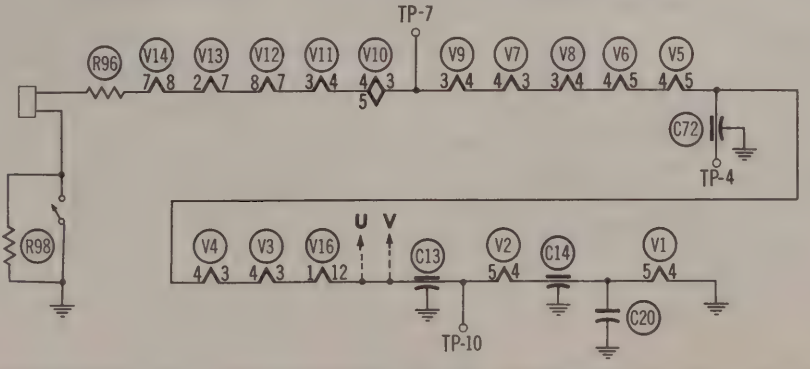
SYNC FAILURE
No vert. sync - **V5, V9, V10**
No horiz. sync - **V9, V11, V12**
No vert. or horiz. sync - **V9**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16, Fuse (M3)**
No vertical deflection - **V5, V10**
Poor vert. linearity or foldover - **V5, V10**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V5, V9, V10**
Horiz. off freq. - **V9, V11, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



SET 310 FOLDER 14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment. The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the osc-mixer tube (V2) from its socket and connect a wire to pin 9. Replace V2 in its socket and connect a clip lead from loose end of wire to chassis. Connect the negative lead of a 5 volt bias supply to point Ⓒ. Connect the positive lead to chassis. Connect a clip lead from point Ⓓ to chassis. In step 6 attenuate sweep generator output to maintain not more than 3 volts peak to peak on scope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to point Ⓗ. Low side to chassis.	Not used	45.5MC (Unmod)	Any	Use VTVM. DC probe to point Ⓐ thru a 10KΩ resistor. Common to chassis.	A1, A2	Attenuate generator output to maintain not more than -2 volts at VTVM.
2.	"	"	"	45.75MC	"	"	A3	"
3.	"	"	"	42.75MC	"	"	A4	"
4.	"	"	"	43.6MC	"	"	A5	"
5.	"	"	"	47.25MC	"	"	A6	Increase generator output for usable reading on VTVM. Adjust for MINIMUM deflection. Repeat steps 1 thru 5.
6.	"	"	43MC (10MC Swp)	41.25MC 42.75MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary retouch A1 thru A5 to obtain desired response. Adjust A3 for maximum amplitude of response curve and position of 45.75MC marker. Adjust A4 for position of 42.75MC marker. A1 and A2 affects bandwidth. A5 affects top portion of curve. Increase sweep generator output and check positions of 47.25MC trap. If necessary, SLIGHTLY retouch A6 for correct position of 47.25MC marker. The 41.25MC marker should be in proper position on curve after correct bandpass and other marker positions are obtained. Remove wire from pin 9 of V2. Disconnect the bias supply and clip lead from point Ⓓ.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna. Tune in a modulated TV signal and adjust the attenuator until signal falls below the limiting level of the 3BN6 (limiter-detector) as evidenced by a hiss similar to super-regeneration. Adjust the sound take-off transformer (A9) and the quadrature coil (A10) for maximum sound of best quality. Adjust the buzz control (R8) for minimum intercarrier buzz. If during alignment of the sound IF the signal rises above the limiting level of the 3BN6 (hiss disappears) increase the attenuation until hiss returns.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2 volt bias supply to point Ⓔ on tuner. Connect the positive lead to chassis. Set the RF trimmer A11 to its center adjustment position. A11 should not require further adjustment unless the RF tube (V1) is replaced. Preset A38 at its center adjustment position. In step 14 adjustment A22 is not necessary if proper bandpass is obtainable by adjusting A21. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Fig. 2	Across antenna terminals thru matching network (Fig. 2).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓕ. Low side to chassis.	A12, A13	Check for response curve similar to Fig.3. If necessary adjust A12 by expanding or compressing coil turns for proper bandwidth. Adjust A13 by expanding or compressing coil turns for maximum amplitude of response curve.
8.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A14	Check for response curve similar to Fig. 3. If necessary adjust by bending loop in or out from switch rotor for proper response.
9.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A15	"
10.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A16	"
11.	"	"	189MC (10MC Swp)	187.25MC 191.75MC	9	"	A17	"
12.	"	"	183MC (10MC Swp)	181.25MC 185.75MC	8	"	A18	"
13.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A19	"
14.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A20, A21, A22	Adjust A21 and A22 for correct bandpass. Adjust A20 for maximum amplitude similar to Fig. 3. &A20, A21 and A22 are adjusted by expanding or compressing coil turns.
15.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A23, A24	Adjust by expanding or compressing coil turns for response curve similar to Fig.3.
16.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A25, A26	"
17.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A27, A28	"
18.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A29, A30	"

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment". Set the fine tuning control to the position where the brass flat shaft is in a horizontal position. Leave it at this mid-range position during entire alignment. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Fig. 2	Across antenna terminals thru matching network (Fig. 2).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A31	Adjust to place video marker at 50% on response curve as shown in Fig. 4. Sound marker should be at 5%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A32	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A33	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A34	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A35	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A36	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A37	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A38	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A39	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A40	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A41	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A42	

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available. Switch the receiver to UHF position. Connect the negative lead of a 2 volt bias supply to point (C). Connect positive lead to chassis. Adjust the sweep generator output to provide 3 volts peak to peak on scope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscopr for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	Fig. 5	Across antenna terminals thru matching network.	713MC (10MC Swp)	711.25MC	54	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A43,A44, A45	Tuner rocker arm should be in the horizontal position. If necessary loosen set screw and adjust tuner so that rocker arm is horizontal when the channel indicator is set to channel 54. Do not adjust A43 unless oscillator calibration is off more than 3 channels. If necessary, adjust A43 to place video marker at 50% on response curve as in Fig. 4. The image (weaker response) will appear also. The response toward the counter clockwise position of A43 is the proper response. Adjust A44 and A45 for maximum amplitude of response similar to Fig. 4.
21.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response curve similar to Fig. 4. If oscillator is off more than 3 channels, adjust the oscillator travel (osc., mixer and antenna travel adjustment are the three round thumb screws on top of tuner) adjustment to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
22.	"	"	887MC (10MC Swp)	885.25MC	83	"	A46,A47, A48	Adjust A46 to place marker at 50% as in Fig. 4. Adjust A47 and A48 for maximum amplitude and symmetry of response similar to Fig. 4.

UHF ADAPTOR ALIGNMENT PART # S22530

This portion has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

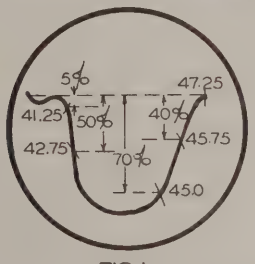
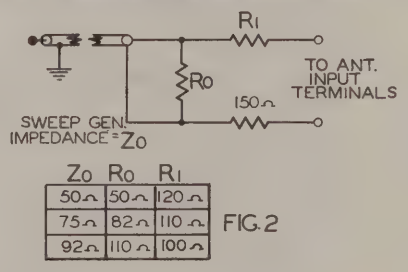


FIG.1



Z0	R0	R1
50Ω	50Ω	120Ω
75Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG.2

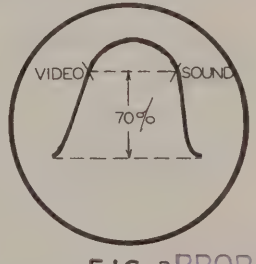


FIG.3

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

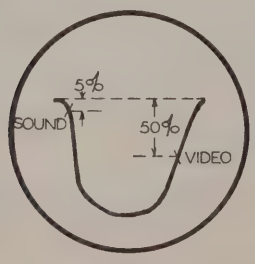


FIG.4

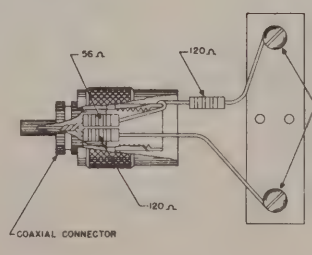
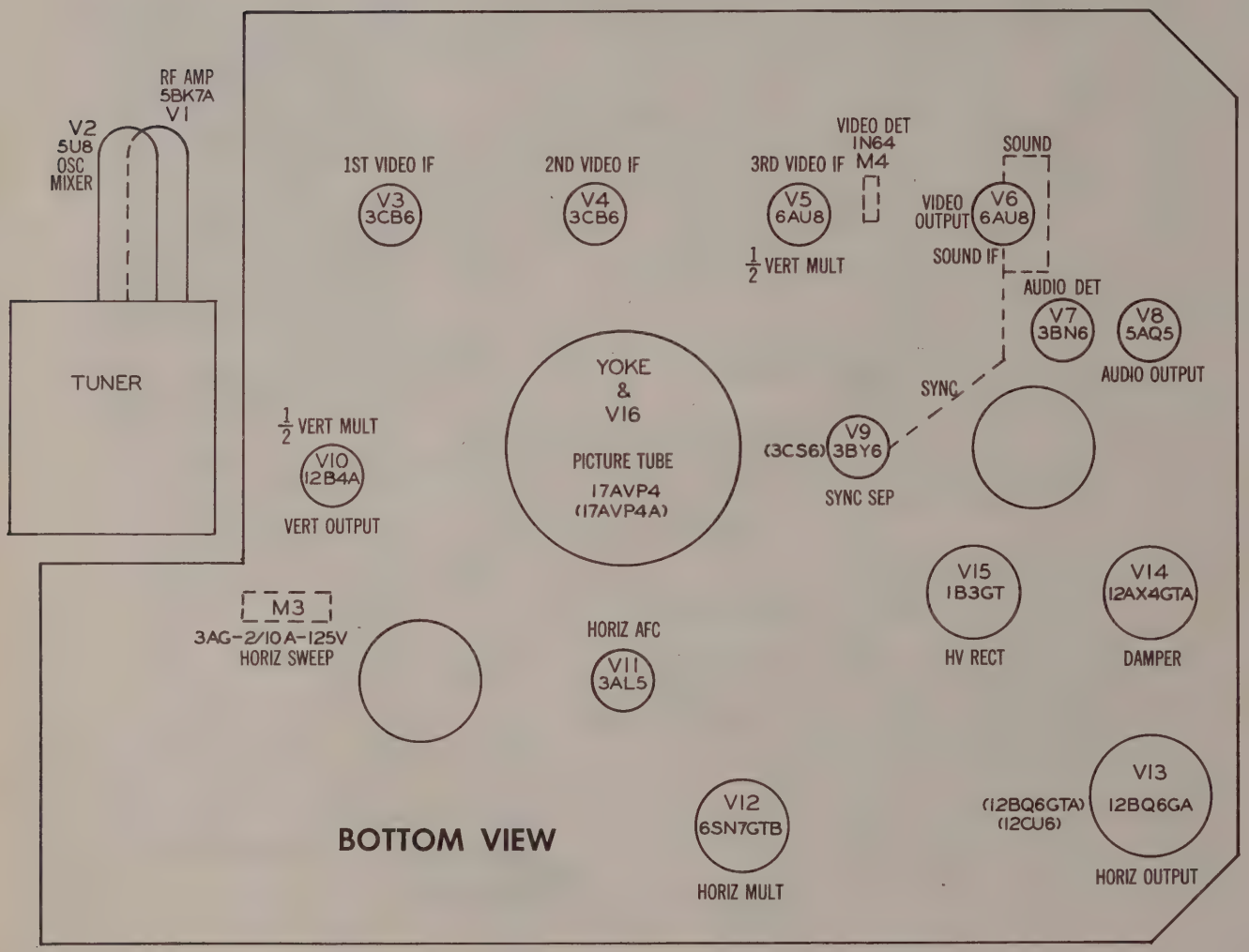


FIG.5

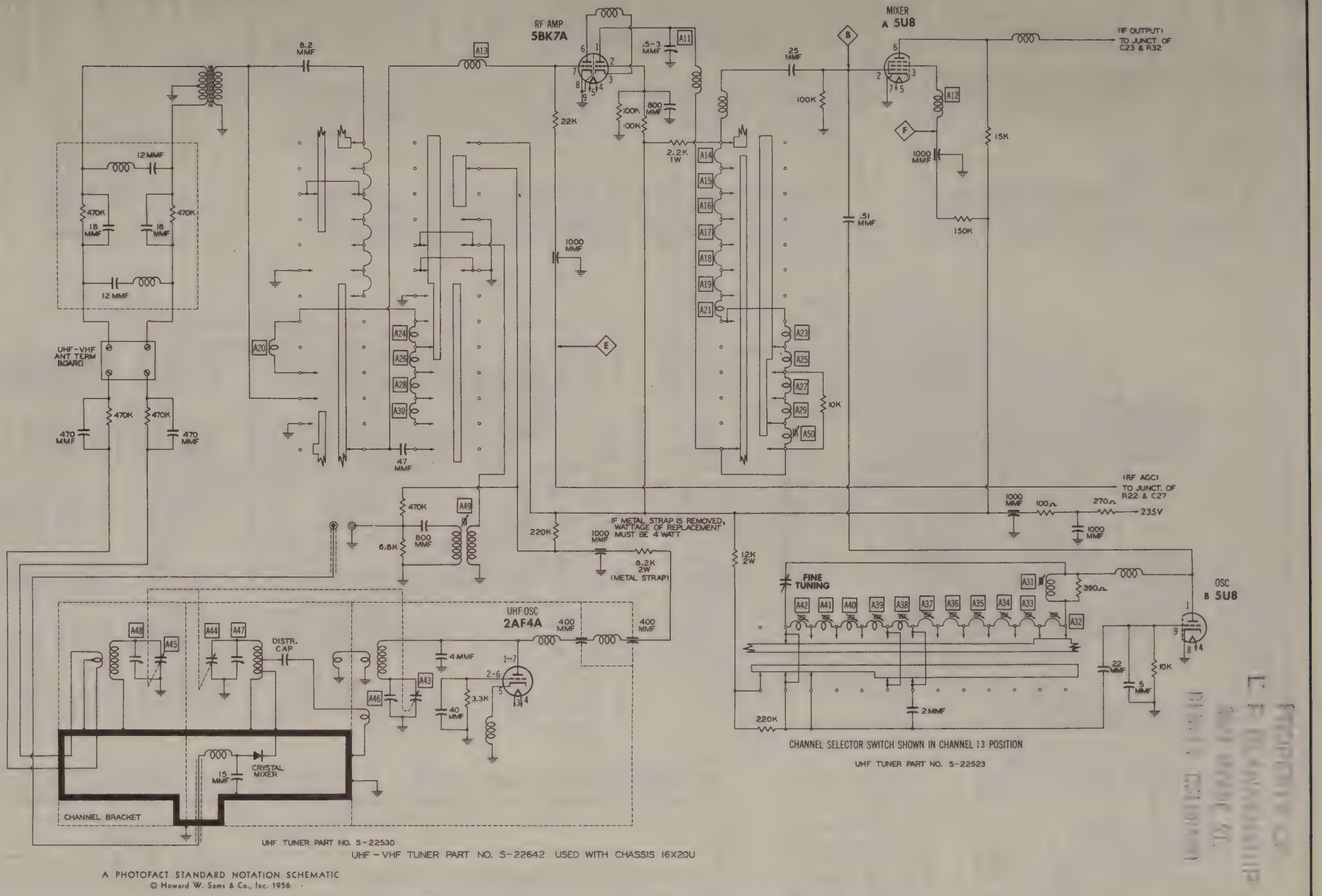
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5BK7A	† L. 8KΩ	60KΩ	INF	1Ω	2Ω	INF	3Meg	0Ω	0Ω
V 2	5U8	† 12KΩ	100KΩ	† 100KΩ	0Ω	1Ω	† L. 3KΩ	0Ω	0Ω	10KΩ
V 3	3CB6	800KΩ	56Ω	4Ω	5Ω	▲ 470Ω	▲ 470Ω	0Ω		
V 4	3CB6	60KΩ	▲ 15Ω	5Ω	6Ω	† 530Ω	† 530Ω	70KΩ		
V 5	6AU8	0Ω	700KΩ	▲ 4Meg	7Ω	6Ω	82Ω	.1Ω	† 5.4KΩ	† 5.4KΩ
V 6	6AU8	0Ω	100KΩ	† 55KΩ	8Ω	7Ω	68Ω	1Meg	† 47KΩ	† 9KΩ
V 7	3BN6	400Ω	.4Ω	9Ω	10Ω	† 22KΩ	5.3Ω	▲ 1.5Meg		
V 8	5AQ5	100KΩ	680Ω	9Ω	8Ω	† L. 1KΩ	† 530Ω	100KΩ		
V 9	3BY6	230KΩ	0Ω	11Ω	10Ω	† 80KΩ	2.3KΩ	L. 5Meg		
V 10	12B4A	2.3KΩ	2.2Meg	11Ω	12Ω	12Ω	NC	2.2Meg	TP	† 650Ω
V 11	3AL5	1Meg	4.7KΩ	13Ω	12Ω	1Meg	NC	2Meg		
V 12	6SN7GTB	200KΩ	▲ 180KΩ	1KΩ	10Meg	† 15KΩ	1KΩ	13Ω	14Ω	
V 13	12BQ6GA	TP	15Ω	TP	† 8.4KΩ	470K	TP	14Ω	0Ω	TOP CAP ▲ 14Ω
V 14	12AX4GTA	TP	NC	120KΩ	NC	† 65Ω	NC	16Ω	15Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 244Ω
V 16	17AUP4	4Ω	100KΩ	PIN 6 † 62Ω	PIN 10 † 62Ω	PIN 11 † 180KΩ	PIN 12 2Ω			

▲ MEASURED FROM PIN 3 OF V14.
▲ MEASURED FROM PIN 7 OF V4.
† MEASURED FROM OUTPUT OF M2.
NC-NO CONNECTION
TP-TIE POINT



TUBE PLACEMENT CHART



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE UHF-VHF TUNER SCHEMATIC

ZENITH MODELS X1814R, RU, X1816E, EU, G, GU, L, LU, R, RU (Ch. 16X20, U)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	5BK7A	5BK7A	
V2	Mixer-Oscillator	5U8	5U8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier - Vert. Mult.	6AU8	6AU8	
V6	Video Output-Sound IF Amp.	6AU8	6AU8	
V7	Audio Detector	3BN6	3BN6	
V8	Audio Output	5AQ5	5AQ5	
V9	Sync Separator	3BY6	3BY6	3CS6 may be used as an alternate
V10	Vert. Mult.-Vert. Output	12B4A	12B4A	
V11	Horizontal AFC	3AL5	3AL5	
V12	Horizontal Mult.	6SN7GTB	6SN7GTB	
V13	Horizontal Output	12BQ6GA	12BQ6GA	12BQ6GTB or 12CU6 may be used as an alternate
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	17AVP4	17AVP4A ①		17AVP4 17AVP4A ②	① Aluminized ②Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	150	22-2638	AFHS1-70	XB005	FP117 FP451.3	TM-140-150	T-055 Q-322 MT-4710	TVL-1428
C2A	■140	300	22-2640						
B	▲4	300							
C	100	50							
D	▲10	475							
C3A	■100	300	22-2639	AFH3-122-30	C-152	FP424.1	TM-3127	T-537	TVL-3672
B	▲10	300							
C	▲20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	12		22-2679		TCZ-12	TZ10	NP0K-120			
C5	18	1000	22-2680		DD-200				10GA-Q18	
C6	18	1000	22-2680		DD-200				10GA-Q18	
C7	12		22-2679		TCZ-12		NP0K-120			
C8	7.5		22-2672							
C9	1000		22-2677							
C10	1.5		22-2424	NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C11	.5-3		22-2453		829-3		3115-01-0R5	CT565A		
C12	800		22-2331	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C13	1000		22-2677							
C14	1000		22-2677							
C15	25		22-2671	N750-DI25	TCN-25	TN07	N750K-250		5TCU-Q25	
C16	.51		22-2676		TCZ-R5	TZ01	NP0A-0R5			
C17	5		22-2674							
C18	22		22-2673	N750-SI22	TCN-22	TN06	N750K-220		5TCU-Q22	
C19	2		22-2675							
C20	800		22-2331	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C21	1000		22-2677							
C22	1000		22-2677							
C23	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C24	4.5		22-2500							
C25	8		22-2481							
C26	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C27	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C28	330		22-2309	SI330	D6-331	TP43	811-331	UC-5333	5GA-T33	
C29	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	470		22-2302	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C31	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	330		22-1645	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C33	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	1		22-1762	NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C35	.047	200	22-1778	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C36	1000		22-17		DD-102	K069	801-001	DC-521	5HK-D1	
C37	47		22-2467	N080-SI47						
C38	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C40	3.3		22-2343	NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C41	50		22-2460	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C42	2.4		22-2596							
C43A	1000		22-21	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C44	10		22-2378							
C45	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C46	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	2200		22-8	BPD-0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C48	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C49	3300		22-11	BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C50	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C51	.022	400	22-2621	BPD-02	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C52	.1	400	22-2061	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	.01	200	22-2565							
C54	.0047	600	22-1849	1464-0047		1R5D47		MCB465	MS-247	
C55	.01	400	22-1846	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C56	.047	200	22-1778	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C57	68		22-2665	1469-000068	D6-680	5R5Q68	801-680		MS-468	
C58	75		22-1746	SI75	DD-750	TP33	GP1K-750	UC-5475	5GA-Q75	
C59	1000		22-17	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C60	4700		22-2624	1464-0047		1R5D47		MCB465	MS-247	
C61	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C62	4700		22-2659	BPD-0047	DD-472	K079	811-0047	UC-5247	5HK-D47	
C63	.0033	200	22-2664	1464-0033		1R5D33			MS-233	
C64	100		22-9	BPD-0001	DD-101	G042	801-101	MCB235	5GA-T1	
C65	330		22-2667	1469-00033	D6-331	5R5T33	811-331		MS-333	
C66	680		22-2668	1464-00068	D6-681	1R5T68	811-681		MS-368	
C67	220		22-2458	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C68	.047	400	22-1775	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C69	160	4000	22-2683							

PARTS LIST A

CAPA

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTR PART
C70	.15	400	22-2261	P488N-15	
C71	82	2000			DD30
C72	800		22-2577		
C73	10000	1400	22-2655	P1688N-01	DD-1

CO

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEM: ZENITH PART No.	CENTRALAB PART No.	CLARO PART
R1A	1Meg	½	63-3273	AB-697	A47-1M
B	Shaft		Not Req.	AK-3	FS-3
C	Switch		Not Req.	KB-1	SWE-1
R2A	500KΩ	½	63-3264	AB-61	
B	Shaft		Not Req.	AK-19	
R3A	750KΩ	½	63-3262	AB-66	A47-75
B	Shaft		Not Req.	AK-19	RN-3
R4A	3500Ω	½	63-3266	AB-9	A47-4
B	Shaft		Not Req.	AK-19	RN-3
R5A	8.5Meg	½	63-3263	AB-89 ♦	A47-7
B	Shaft		Not Req.	AK-19	RN-3
R6A	50KΩ	½	63-3261	BX-31	A47-5
B	Shaft		Not Req.	Not Req.	RN-3
R7A	7000Ω	2	63-3260	V-136	A43-7
B	Shaft		Not Req.	Not Req.	FKS-1
R8	750Ω	2	63-3284		39-80

♦ Connect a 1Meg resistor in series with the right hand ter terminal of the original control, (control viewed from sh

RESI

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R9	470KΩ	½	63-1898	BTS-470K	
R10	470KΩ	½	63-1898	BTS-470K	
R11	15KΩ	½	63-1834	BTS-15K	
R12	100KΩ	½	63-1869	BTS-100K	
R13	100KΩ	½	63-1869	BTS-100K	
R14	1500Ω	½	63-1792	BTS-1500	
R15	2700Ω	½	63-1803	BTS-2700	
R16	10KΩ	½	63-1827	BTS-10K	
R17	390Ω	½	63-1768	BTS-390	
R18	12KΩ	2	63-1091	BTB-12K	
R19	100KΩ	½	63-1869	BTS-100K	
R20	15KΩ	½	63-1834	BTS-15K	
R21	100KΩ	½	63-1869	BTS-100K	
R22	2.2Meg	½	63-1926	BTS-2.2Meg	
R23	820KΩ	½	63-1908	BTS-820K	
R24	270KΩ	½	63-1887	BTS-270K	
R25	2.2Meg 5%	½	63-1924	BTS-2.2Meg 5%	
R26	1Meg	½	63-1911	BTS-1Meg	
R27	8.2Meg 5%	½	63-1949	BTS-8.2Meg 5%	
R28	220KΩ	½	63-1883	BTS-220K	
R29	5.6Meg	½	63-1943	BTS-5.6Meg	
R30	680KΩ	½	63-1905	BTS-680K	
R31	1.5Meg	½	63-1919	BTS-1.5Meg	
R32	1000Ω	½	63-1786	BTS-1000	
R33	270Ω	½	63-1761	BTS-270	
R34	47KΩ	½	63-1856		
R35	18KΩ	½	63-1838		
R36	56Ω	½	63-1733	BTS-56	
R37	470Ω	½	63-1772	BTS-470	
R38	6800Ω	½	63-1821		
R39	15Ω	½	63-1708	BTS-15	
R40	120KΩ	½	63-1873		
R41	120KΩ	½	63-1873		
R42	470Ω	½	63-1772	BTS-470	
R43	5400Ω	4	63-3574		
R44	82Ω	½	63-1740	BTS-82	
R45	4700Ω	½	63-1813	BTS-4700	
R46	22KΩ	½	63-1841	BTS-22K	
R47	1Meg	½	63-1912	BTS-1Meg	
R48	47KΩ	1	63-1194	BTA-47K	
R49	68Ω	½	63-1736	BTS-63	
R50	22KΩ	½	63-1841	BTS-22K	
R51	2700Ω	½	63-1574	BTS-2700	
R52	33KΩ	½	63-1848	BTS-33K	
R53	100KΩ	½	63-1870	BTS-100K	

Note 1. Some versions use a 33KΩ ½W
Note 2. Some versions use a 22KΩ ½W
Note 3. Some versions use a 1200Ω 1W

TRANSFORMERS

ITEM No.	USE	ZENITH PART No.	Halldorson PART No.	M PAR
T1	Horiz. Output Trans.	S-22451 ①		
T2	Vert. Output Trans.	95-1441	Z1900 ② ③	A-2
T3A	Yoke (90°) Horiz. (13.5MH)	95-1435 ⑤	DF606 ⑥	MDI
B	Vert. (42MH)			

① Complete assembly includes: Winding & term assembl tertiary winding & term
② Use 9 to 1 turns ratio.
③ Connect as auto trans.
④ Drill new mounting hole(s).
⑤ Includes capacitor C71; Resistors R75, R76
⑥ Connect horiz. damping network across terms #3 & #

TRANSFORMER

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMEN: ZENITH PART No.	Halldorson PART No.	Merit PART No.
T4	10.1KΩ	4.2Ω	95-1428		

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	5BE7A	5BE7A	
V2	Mixer-Oscillator	5U8	5U8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier – Vert. Mult.	6AU8	6AU8	
V6	Video Output-Sound IF Amp.	6AU8	6AU8	
V7	Audio Detector	3BN6	3BN6	
V8	Audio Output	5AQ5	5AQ5	
V9	Sync Separator	3BY6	3BY6	3CB6 may be used as an alternate
V10	Vert. Mult.-Vert. Output	12B4A	12B4A	
V11	Horizontal AFC	3AL5	3AL5	
V12	Horizontal Mult.	6SN7GTB	6SN7GTB	
V13	Horizontal Output	12DQ6GA	12DQ6GA	12DQ6GTB or 13CU6 may be used as an alternate
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	17AVP4			17AVP4 ① 17AVP4A ②	① Aluminized ②Silver screen "B5"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	150	23-3230	AFHBL-70	KBS05	FP17	TM-140-150	T-053	TVL-1428
C2A	⌀140	300	23-3240			FP451.3		Q-322 MT-4710	
B	⌀4	300							
C	100	50							
D	⌀10	475							
C3A	⌀100	300	23-3230	AFE3-122-30	C-1S2	FP434.1	TM-3127	T-537	TVL-3672
B	⌀10	300							
C	⌀20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	13		23-3279		TC2-12	TS10	M90K-130		10GA-Q18	
C5	18	1000	23-3280		DD-200				10GA-Q38	
C6	18	1000	23-3280		DD-200					
C7	13		23-3279		TC2-12		M90K-130			
C8	7.5		23-3272							
C9	1000		23-3277							
C10	1.5		23-3424	M90-821.5	TC2-1R5	TZ04	M90A-1R5	ZT-5515	5TCCB-V15	
C11	8-3		23-3453		826-3		M90A-8R3	C7651A		
C12	800		23-3231	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C13	1000		23-3277							
C14	1000		23-3277							
C15	25		23-3271	N750-DJ25	TC5-25	TN07	N750K-250		5TCU-Q25	
C16	.51		23-3278		TC2-R5	TZ01	M90A-051			
C17	5		23-3274							
C18	22		23-3273	N750-SJ22	TC5-22	TN06	N750K-220		5TCU-Q22	
C19	5		23-3275							
C20	800		23-3231	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C21	1000		23-3277							
C22	1000		23-3277							
C23	470		23-3	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C24	4.5		23-3200		TC2-1	TZ02	M90A-010		5TCCB-V1	
C25	.047	300	23-1778	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C26	1000		23-17		DD-102	K069	801-001	DC-531	5HK-D1	
C27	47		23-3467	N090-S147						
C28	.1	200	23-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C29	.1	200	23-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C30	3.3		23-2343	NP0-S13.3	TC2-3R3	TZ06	M90A-3R3	ZT-5533	5TCCB-V33	
C31	100		23-2460	S150	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C32	330		23-1645	S330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C33	1000		23-17	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C34	1		23-1763	NP0-S1	TC2-1	TZ02	M90A-010		5TCCB-V1	
C35	.047	300	23-1778	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C36	1000		23-17		DD-102	K069	801-001	DC-531	5HK-D1	
C37	47		23-3467	N090-S147						
C38	.1	200	23-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	.1	200	23-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C40	3.3		23-2343	NP0-S13.3	TC2-3R3	TZ06	M90A-3R3	ZT-5533	5TCCB-V33	
C41	50		23-2460	S150	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C42	3.4		23-2596							
C42A	1000		22-21	BPD-EX001	DD2-102	DK069	812-001	DCD-531	5HK-ED1	
B	1000									
C44	10		22-2378							
C45	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C46	10000		22-3	BPD-01	DD-103	K062	811-01	DC-511	5HK-E1	
C47	2200		22-8	BPD-0023	D6-222	K073	811-0022	UC-5222	5HK-D22	
C48	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C49	3300		22-11	BPD-0033	D6-332	K077	811-0033	UC-5333	5HK-D33	
C50	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C51	.022	400	22-3451	BPD-03	DF-303	CUB4S22	S17-03	PT4122	4TM-S22	
C52	.1	400	22-2061	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	.01	200	22-2565							
C54	.0047	600	22-1849	1464-0047		1R5D47		MCB465	MB-347	
C55	.01	400	22-1846	BPD-01	D6-103	CUB4S1	GP3-333-103	PT4A1	4TM-S1	
C56	.047	300	22-1778	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C57	68		22-2665	1469-000068	D6-680	5R5Q68	S01-680		MB-468	
C58	75		22-1746	S175	D6-750	TP33	GP1K-750	UC-5475	5GA-Q75	
C59	1000		23-17	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C60	4700		22-3224	1464-0047		1R5D47		MCB465	MB-347	
C61	470		23-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C62	4700		22-3259	BPD-0047	DD-472	K079	811-0047	UC-5347	5HK-D47	
C63	.0033	200	22-2564	1464-0033		1R5D33			MB-333	
C64	100		23-8	BPD-0001	DD-101	K043	S01-101	MCB335	5GA-T1	
C65	330		22-3667	1469-00033	D6-331	5R5T33	S1I-331		MB-333	
C66	680		22-2665	1464-00068	D6-681	1R5T68	S1I-681		MB-368	
C67	220		22-3458	S1220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C68	.047	400	22-1775	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C69	180	4000	22-2683							

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C70	15	400	23-3261	P488N-15		CUB4P15		PT4615	4TM-P15	
C71	68	3000			DD30-680				30GA-Q68	
C72	600		23-3277							
C73	10000	1400	22-2652	P168M-01	DD-103	CUB6S1		PT4611	30HKD-S1	

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3273	AB-S97	A47-1Meg-S	Q11-137	U-54	Volume
B	Shaft		Not Req.	AE-9	FS-S	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SW2-12	Not Req.	Not Req.	Attach to R1A.
R2A	500KΩ	½	63-3264	AB-S1		Q17-133	TAP5SR	Brightness
B	Shaft		Not Req.	AE-19		TQ	Not Req.	Attach to R2A.
R3A	750KΩ	½	63-3263	AB-S6	A47-750K-S	Q11-136	TAP75L	Vertical Hold
B	Shaft		Not Req.	AE-19	RN-3	TQ	Not Req.	Attach to R3A.
R4A	3500Ω	½	63-3266	AB-9	A47-6000-S	Q11-114	TAP25L	Vertical Linearity
B	Shaft		Not Req.	AE-19	RN-3	TQ	Not Req.	Attach to R4A.
R5A	5.5Meg	½	63-3253	AB-S9 ✦	A47-7.5Meg-	Q11-143 ✦	TAP25SL ✦	Height Stop at 7.5Meg
B	Shaft		Not Req.	AE-19	RN-3 S ✦	TQ	Not Req.	Attach to R5A.
R6A	50KΩ	½	63-3261	BX-3L	A47-50K-S	Q11-123	TAP5L	Horizontal Hold
B	Shaft		Not Req.	AE-19	RN-3	TQ	Not Req.	Attach to R6A.
R7A	7000Ω	2	63-3260	V-136	A43-7500	WK-7500	RT500L	Contrast (Wire Wound)
B	Shaft		Not Req.	Not Req.	FXS-1/4	Not Req.	Not Req.	Attach to R7A.
R8	7500	2	63-3264		39-800			Buss (Wire Wound)

✦ Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control, (control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R9	470KΩ	½	63-1898	BTS-470K	
R10	470KΩ	½	63-1898	BTS-470K	
R11	15KΩ	½	63-1834	BTS-15K	
R12	100KΩ	½	63-1869	BTS-100K	
R13	100KΩ	½	63-1869	BTS-100K	
R14	1500Ω	½	63-1792	BTS-1500	
R15	2700Ω	½	63-1803	BTS-2700	
R16	10KΩ	½	63-1827	BTS-10K	
R17	390Ω	½	63-1786	BTS-390	
R18	12KΩ	½	63-1091	BTS-12K	
R19	100KΩ	½	63-1869	BTS-100K	
R20	15KΩ	½	63-1834	BTS-15K	
R21	100KΩ	½	63-1869	BTS-100K	
R22	2.2Meg	½	63-1926	BTS-2.2Meg	
R23	620KΩ	½	63-1908	BTS-620K	
R24	270KΩ	½	63-1887	BTS-270K	
R25	2.2Meg	½	63-1934	BTS-2.2Meg	
	5%			5%	
R26	1Meg	½	63-1911	BTS-1Meg	
R27	6.2Meg 5%	½	63-1949	BTS-6.2Meg	
				5%	
R28	220KΩ	½	63-1883	BTS-220K	
R29	5.6Meg	½	63-1943	BTS-5.6Meg	
R30	680KΩ	½	63-1906	BTS-680K	
R31	1.5Meg	½	63-1919	BTS-1.5Meg	
R32	1000Ω	½	63-1766	BTS-1000	
R33	270Ω	½	63-1781	BTS-270	
R34	47KΩ	½	63-1856		
R35	18KΩ	½	63-1836		
R36	56Ω	½	63-1733	BTS-56	
R37	470Ω	½	63-1772	BTS-470	
R38	6800Ω	½	63-1831		
R39	150	½	63-1708	BTS-15	
R40	120KΩ	½	63-1873		
R41	120KΩ	½	63-1873		
R42	470Ω	½	63-1772	BTS-470	
R43	5600Ω	½	63-1574		
R44	82Ω	½	63-1740	BTS-82	
R45	4700Ω	½	63-1813	BTS-4700	
R46	22KΩ	½	63-1841	BTS-22K	
R47	1Meg	½	63-1911	BTS-1Meg	
R48	470Ω	½	63-1194	BTA-47K	
R49	68Ω	½	63-1738	BTS-68	
R50	22KΩ	½	63-1841	BTS-22K	
R51	2700Ω	½	63-1574	BTS-2700	
R52	33KΩ	½	63-1848	BTS-33K	
R53	100KΩ	½	63-1870	BTS-100K	
R54	100KΩ	½	63-1870	BTS-100K	
R55	680Ω	½	63-1779	BTS-680	
R56	1.5Meg	½	63-1919	BTS-1.5Meg	
R57	33KΩ	½	63-1848	BTS-33K	
R58	2.2MΩ	3	63-2141	BTS-22K	
R59	470Ω	3	63-1781	BTS-47K	
R60	680Ω	1	63-2290	BTA-680	
R61	2.2Meg	½	63-1925	BTS-2.2Meg	
R62	220KΩ	½	63-1883	BTS-220K	
R63	68KΩ	½		BTS-68K	Note 1
R64	390KΩ	½	63-1894	BTS-390K	
R65	100KΩ	½	63-1869	BTS-100K	
R66	27KΩ	½		BTS-27K	Note 2
R67	330KΩ	½	63-1890	BTS-330K	
R68	100KΩ	½	63-1869	BTS-100K	
R69	47KΩ	½	63-1856	BTS-47K	
R70	220Ω	½	63-1758	BTS-220	
R71	2.2Meg	½	63-1925	BTS-2.2Meg	
R72	100KΩ	½	63-1870	BTS-100K	
R73	820Ω	1		BTA-820	Note 3
R74	68Ω	½	63-1727	BTS-68	
R75	560Ω	1			
R76	560Ω	1			
R77	150KΩ	½	63-1877	BTS-150K	
R78	1Meg	½	63-1911		
R79	1Meg	½	63-1911		
R80	4700Ω	½	63-1813		
R81	180KΩ	½	63-1880		
R82	5.6Meg	½	63-1943		
R83	15KΩ	½	63-1065		
R84	330KΩ	½	63-1890		
R85	180KΩ	½	63-1880		
R86	470KΩ	½	63-1898		
R87	180KΩ	½	63-2313		
R88	13KΩ	½	63-1831		
R89	1000Ω	½	63-1765		
R90	100Ω	½	63-1744		
R91	470KΩ	½	63-1898		
R92	100Ω	½	63-1744		
R93	8200Ω	2	63-1151		
R94	47KΩ	2	63-2212	BTS-47K	
R95	2.2Ω	3	63-2114	BW1-2.2	
R96	50Ω	20	63-2273	2D-50	
R97	7.5Ω	8	63-2269		
R98	470KΩ	½	63-1898	BTS-470K	
R99	470KΩ	½	63-1898	BTS-470K	

Note 1. Some versions use a 33KΩ ½W resistor in this application (Mfgr. Part No. 63-1848).
Note 2. Some versions use a 22KΩ ½W resistor in this application (Mfgr. Part No. 63-1840).
Note 3. Some versions use a 130Ω 1W resistor in this application (Mfgr. Part No. 63-1976).

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: ZENITH PART No.	Hallidorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.
T1	Horiz. Output Trans.	S-22451 ①							
T2	Vert. Output Trans.	93-1441	Z1900 ② ③	A-2823 ③		V307 ② ③	A-8113 ③	26S73	A-108X ② ③
T3A	Yoke (90°) Horiz. (19.1MH)	95-1435 ③	DF608 ③	MDF-91.5	23TD1 ③	Y90F12/ 47 ③	DY-13A ③	Y-14 ③	Y-40-1 ② ③
B	Vert. (42MH)								

① Complete assembly includes: Winding & term assembly, Zenith Part No. S-22448
tertiary winding & term assembly, Zenith Part No. S-22446
② Use 2 to 1 turns ratio.
③ Connect as auto trans.
④ Drill new mounting hole(s).
⑤ Includes capacitor C71; Resistors R75, R76
⑥ Connect horiz. damping network across terms #3 & #7. Use original if necessary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	IMPEDANCE: SEC	REPLACEMENT DATA: ZENITH PART No.	Hallidorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.	NOTES
T4	10.1KΩ	4, 2Ω	95-1428					S-11X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V C IMP.	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: OHAM PART No.	REPLACEMENT DATA: RCA TYPE No	NOTES
SP1	4"	PM	4, 2Ω	49-750	4A07	23S31	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap Coil	0Ω		20-567				
L2	IF Trap Coil	0Ω		20-567				
L3	Ant. Matching Trans.							
L4	Ant. Coil	0Ω		20-690				Channel 13
L5	Ant. Coils	0Ω						Channels 7 thru 12
L6	Ant. Coil	0Ω		20-558				Channel 6
L7	Ant. Coil	0Ω		20-558				Channel 5
L8	Ant. Coil	0Ω		20-558				Channel 4
L9	Ant. Coil	0Ω		20-558				Channel 3
L10	Ant. Coil	0Ω		20-558				Channel 2
L11	Neut. Coil	0Ω		20-550				
L12	RF Coil	0Ω		20-569				Channel 13
L13	LF Coils	0Ω		20-571				Channels 7 thru 12
L14	RF Coil	0Ω		20-579				Channel 6
L15	RF Coil	0Ω		20-580				Channel 5
L16	RF Coil	0Ω		20-581				Channel 4
L17	RF Coil	0Ω		20-581				Channel 3
L18	RF Coil	0Ω		20-581				Channel 3
L19	RF Coil	0Ω		20-581				Channel 2
L20	Osc. Coil	0Ω		20-549				
L21	Osc. Coil	0Ω		20-577				Channel 13
L22	Osc. Coils	0Ω						Channel 7 thru 12
L23	Osc. Coil	0Ω		20-576				Channel 16
L24	Osc. Coil	0Ω		20-575				Channel 5
L25	Osc. Coil	0Ω		20-574				Channel 4
L26	Osc. Coil	0Ω		20-573				Channel 3
L27	Osc. Coil	0Ω		20-573				Channel 2
L28	Feedback Coil			20-601				
L29	Conv. Plate			S-22549				
L30	1st Video IF	.1Ω		S-23221				Includes 47.25MC Trap-Note 1
L31	2nd Video IF	.1Ω	.1Ω	S-23244 ✦	17-5003 ✦	TV-127 ✦	6232 ✦	
L32	3rd Video IF	.1Ω	.1Ω	S-23245 ✦	17-5004 ✦	TV-125 ✦	6234 ✦	
L33	4th Video IF	.6Ω	.6Ω	S-23018	17-4501			Complete Assembly Part No. S-23017
L34	Series Peaking Coil	4.6Ω		S-23444	19-9022		6236	28 Microhenries
L35	Shunt Peaking Coil	13Ω		S-23475	19-3500		6146	575 Microhenries
L35A	4.5MC Trap	13Ω		S-23290				
B	1st Sound IF	1.9Ω						
L37	Series Peaking Coil	5.5Ω		S-20580	19-3125 ▲	TV-123	6133 ▲	137 Microhenries; Wound on 1SKD resistor Complete Assembly Part No S-23348
L38	2nd Sound IF	.3Ω	.4Ω	S-23247 ✦	17-3495 ✦	TV-113 ✦	6203 ✦	
L39	Quadrature Coil	5.3Ω		S-19020	20-1004 ✦	TV-151 ✦	1480 ✦	

Note 1. Includes 6MMF, 410MMF, 4.5MMF Caps., 47.25MC Trap, 47.25MC Trap Shunt Coil, and 1st Video IF Complete Assembly Part No. 23238-47.25MC Trap Shunt Coil Part No. 20-604.
✦ Use adaptor plate & detune trap.
▲ Use adaptor plate
▲ Parallel with 18KΩ resistor.
✦ Drill mounting hole.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No	Ram PART No	Thordarson PART No	Tried PART No	NOTES
L40	195Ω		S-23259		19-1576	TV-183	6210		56B22		

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: ZENITH PART No.	Hallidorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No
L41	.230 ADC	62Ω	L 94HY	95-1376	C5037 ①	C329H ①	C3238 ①	26C44	C-23X

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No	RATING: CURRENT	REPLACEMENT DATA: ZENITH PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.230A	212-14		1090A	MR-300	66300	6Q4	300
M2	.230A	212-14		1090A	MR-300	66300	6Q4	300

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG 8/B	2/10A 125V	136-23		313.200 (3AG 8/B 2/10A)	357001	MDL 2/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: ZENITH PART No.	SYLVANIA PART No.	NOTES
M4	1N64	103-1	1N50	Video Det. (Pigtail)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	5BK7A	5BK7A	
V2	Mixer-Oscillator	5U8	5U8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier - Vert. Mult.	6AU8	6AU8	
V6	Video Output-Sound IF Amp.	6AU8	6AU8	
V7	Audio Detector	3BN6	3BN6	
V8	Audio Output	5AQ5	5AQ5	
V9	Sync Separator	3BY6	3BY6	3CS6 may be used as an alternate
V10	Vert. Mult.-Vert. Output	12B4A	12B4A	
V11	Horizontal AFC	3AL5	3AL5	
V12	Horizontal Mult.	6SN7GTB	6SN7GTB	
V13	Horizontal Output	12BQ6GA	12BQ6GA	12BQ6GTB or 12CU6 may be used as an alternate
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	17AVP4	17AVP4A ①		17AVP4 17AVP4A ②	① Aluminized ②Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	150	22-2638	AFHS1-70	XB005	FP117 FP451.3	TM-140-150	T-055 Q-322 MT-4710	TVL-1428
C2A	■140	300	22-2640						
B	▲4	300							
C	100	50							
D	▬10	475							
C3A	■100	300	22-2639	AFH3-122-30	C-152	FP424.1	TM-3127	T-537	TVL-3672
B	▬10	300							
C	▲20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	12		22-2679		TCZ-12	TZ10	NP0K-120			
C5	18	1000	22-2680		DD-200				10GA-Q18	
C6	18	1000	22-2680		DD-200				10GA-Q18	
C7	12		22-2679		TCZ-12		NP0K-120			
C8	7.5		22-2672							
C9	1000		22-2677							
C10	1.5		22-2424	NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C11	.5-3		22-2453		829-3		3115-01-0R5	CT565A		
C12	800		22-2331	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C13	1000		22-2677							
C14	1000		22-2677							
C15	25		22-2671	N750-DI25	TCN-25	TN07	N750K-250		5TCU-Q25	
C16	.51		22-2676		TCZ-R5	TZ01	NP0A-0R5			
C17	5		22-2674							
C18	22		22-2673	N750-SI22	TCN-22	TN06	N750K-220		5TCU-Q22	
C19	2		22-2675							
C20	800		22-2331	BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C21	1000		22-2677							
C22	1000		22-2677							
C23	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C24	4.5		22-2500							
C25	8		22-2481							
C26	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C27	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C28	330		22-2309	SI330	D6-331	TP43	811-331	UC-5333	5GA-T33	
C29	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	470		22-2302	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C31	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	330		22-1645	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C33	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	1		22-1762	NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C35	.047	200	22-1778	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C36	1000		22-17		DD-102	K069	801-001	DC-521	5HK-D1	
C37	47		22-2467	N080-SI47						
C38	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C40	3.3		22-2343	NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C41	50		22-2460	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C42	2.4		22-2596							
C43A	1000		22-21	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C44	10		22-2378							
C45	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C46	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	2200		22-8	BPD-0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C48	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C49	3300		22-11	BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C50	.1	200	22-1777	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C51	.022	400	22-2621	BPD-02	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C52	.1	400	22-2061	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	.01	200	22-2565							
C54	.0047	600	22-1849	1464-0047		1R5D47		MCB465	MS-247	
C55	.01	400	22-1846	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C56	.047	200	22-1778	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C57	68		22-2665	1469-000068	D6-680	5R5Q68	801-680		MS-468	
C58	75		22-1746	SI75	DD-750	TP33	GP1K-750	UC-5475	5GA-Q75	
C59	1000		22-17	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C60	4700		22-2624	1464-0047		1R5D47		MCB465	MS-247	
C61	470		22-6	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C62	4700		22-2659	BPD-0047	DD-472	K079	811-0047	UC-5247	5HK-D47	
C63	.0033	200	22-2664	1464-0033		1R5D33			MS-233	
C64	100		22-9	BPD-0001	DD-101	G042	801-101	MCB235	5GA-T1	
C65	330		22-2667	1469-00033	D6-331	5R5T33	811-331		MS-333	
C66	680		22-2668	1464-00068	D6-681	1R5T68	811-681		MS-368	
C67	220		22-2458	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C68	.047	400	22-1775	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C69	160	4000	22-2683							

ITEM No.	RATING: CAP.	RATING: VOLT	
C70	.15	400	22
C71	82	2000	
C72	800		22
C73	10000	1400	22

ITEM No.	RATING: RESISTANCE	RATING: WATTS	
R1A	1Meg	½	6
B	Shaft		N
C	Switch		N
R2A	500KΩ	½	6
B	Shaft		N
R3A	750KΩ	½	6
B	Shaft		N
R4A	3500Ω	½	6
B	Shaft		N
R5A	8. 5Meg	½	6
B	Shaft		N
R6A	50KΩ	½	6
B	Shaft		N
R7A	7000Ω	2	6
B	Shaft		N
R8	750Ω	2	6

♦ Connect a 1Meg resisto terminal of the original

ITEM No.	RATING: OHMS	RATING: WATT	Z P
R9	470KΩ	½	63-
R10	470KΩ	½	63-
R11	15KΩ	½	63-
R12	100KΩ	½	63-
R13	100KΩ	½	63-
R14	1500Ω	½	63-
R15	2700Ω	½	63-
R16	10KΩ	½	63-
R17	390Ω	½	63-
R18	12KΩ	2	63-
R19	100KΩ	½	63-
R20	15KΩ	½	63-
R21	100KΩ	½	63-
R22	2. 2Meg	½	63-
R23	820KΩ	½	63-
R24	270KΩ	½	63-
R25	2. 2Meg 5%	½	63-
R26	1Meg	½	63-
R27	8.2Meg 5%	½	63-
R28	220KΩ	½	63-
R29	5. 6Meg	½	63-
R30	680KΩ	½	63-
R31	1. 5Meg	½	63-
R32	1000Ω	½	63-
R33	270Ω	½	63-
R34	47KΩ	½	63-
R35	18KΩ	½	63-
R36	56Ω	½	63-
R37	470Ω	½	63-
R38	6800Ω	½	63-
R39	15Ω	½	63-
R40	120KΩ	½	63-
R41	120KΩ	½	63-
R42	470Ω	½	63-
R43	5400Ω	4	63-
R44	82Ω	½	63-
R45	4700Ω	½	63-
R46	22KΩ	½	63-
R47	1Meg	½	63-
R48	47KΩ	1	63-
R49	68Ω	½	63-
R50	22KΩ	½	63-
R51	2700Ω	½	63-
R52	33KΩ	½	63-
R53	100KΩ	½	63-

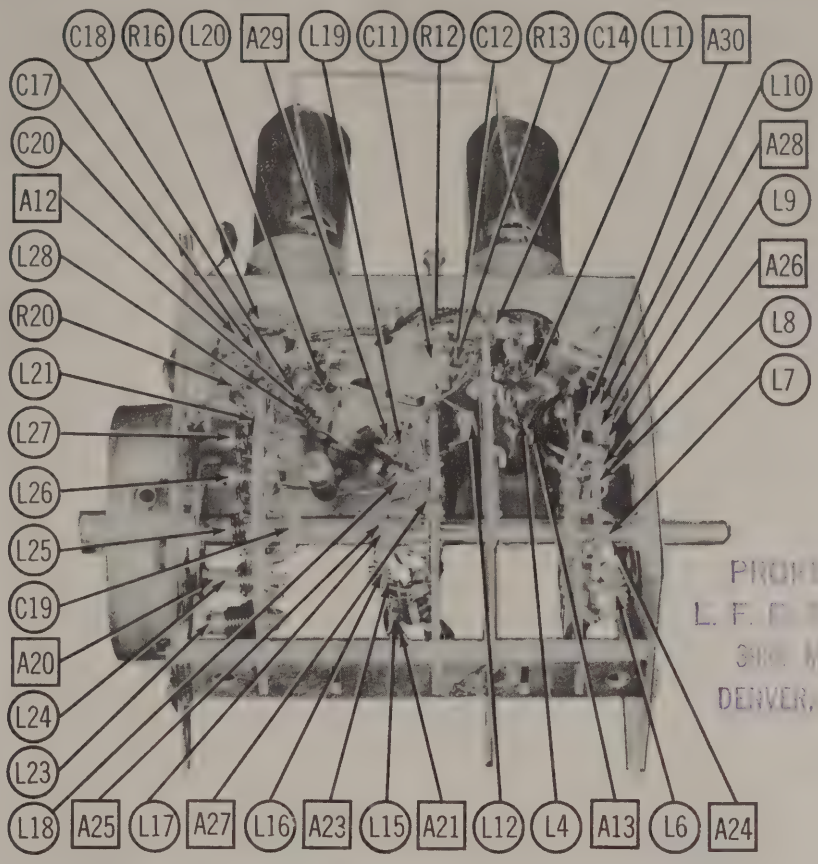
Note 1.
Note 2.
Note 3.

ITEM No.	USE
T1	Horiz. Output Trans.
T2	Vert. Output Trans.
T3A	Yoke (90°) Horiz. (13. 5MH)
B	Vert. (42MH)

① Complete assembly incl

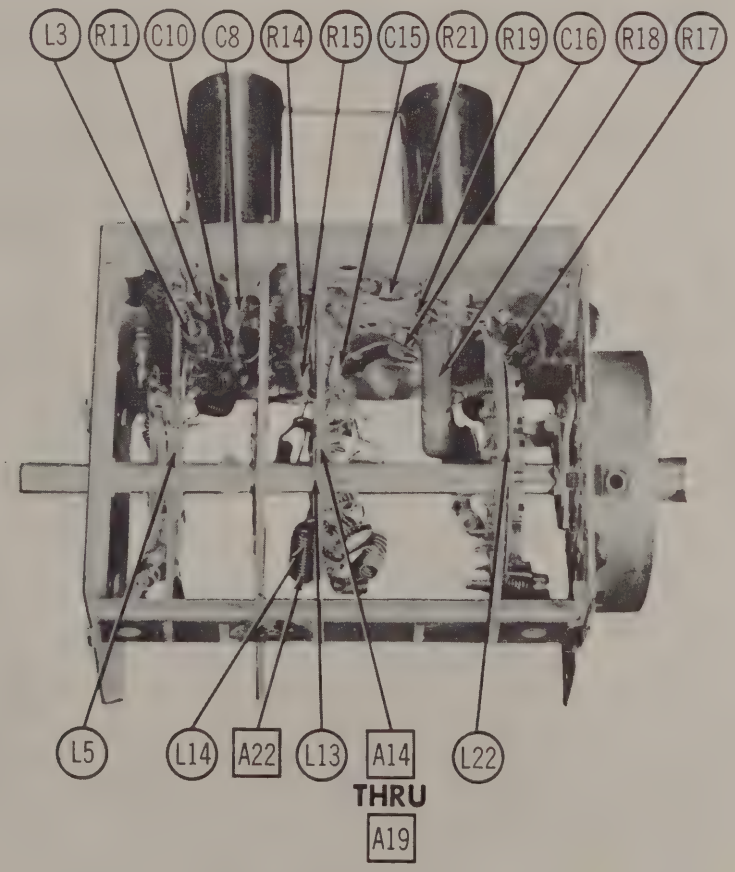
② Use 9 to 1 turns ratio.
③ Connect as auto trans.
④ Drill new mounting hole(
⑤ Includes capacitor C71;
⑥ Connect horiz. damping

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	ZENIT PART
T4	10.1KΩ	4. 2Ω	95-142

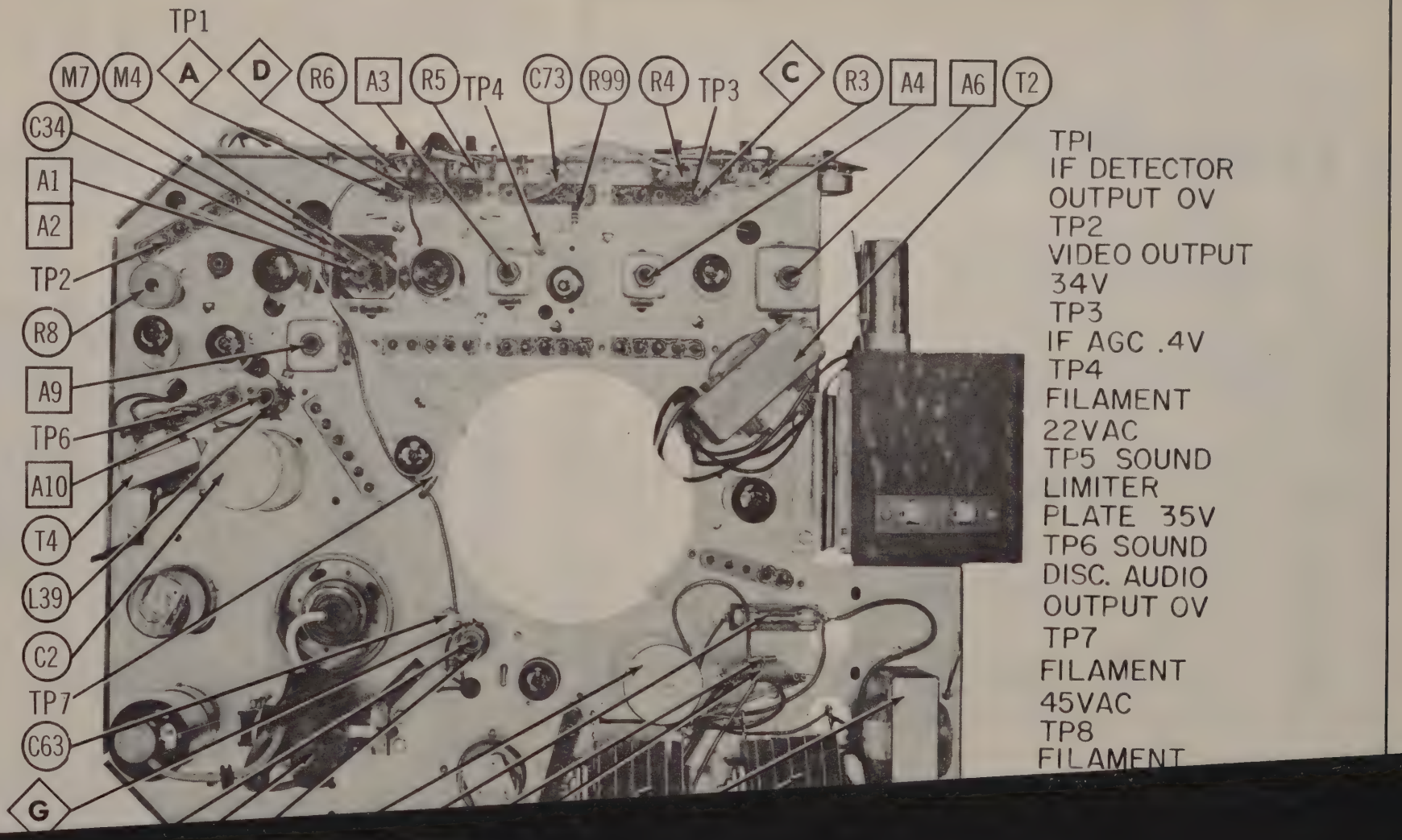


PROPERTY OF
L. F. D[illegible]
[illegible] Main St
DENVER, COLORADO

RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE


TP1
M7
M4
A
D
R6
A3
R5
TP4
C73
R99
R4
TP3
C
R3
A4
A6
T2
C34
A1
A2
TP2
R8
A9
TP6
A10
T4
L39
C2
TP7
C63
G
TPI
IF DETECTOR
OUTPUT OV
TP2
VIDEO OUTPUT
34V
TP3
IF AGC .4V
TP4
FILAMENT
22VAC
TP5 SOUND
LIMITER
PLATE 35V
TP6 SOUND
DISC. AUDIO
OUTPUT OV
TP7
FILAMENT
45VAC
TP8
FILAMENT

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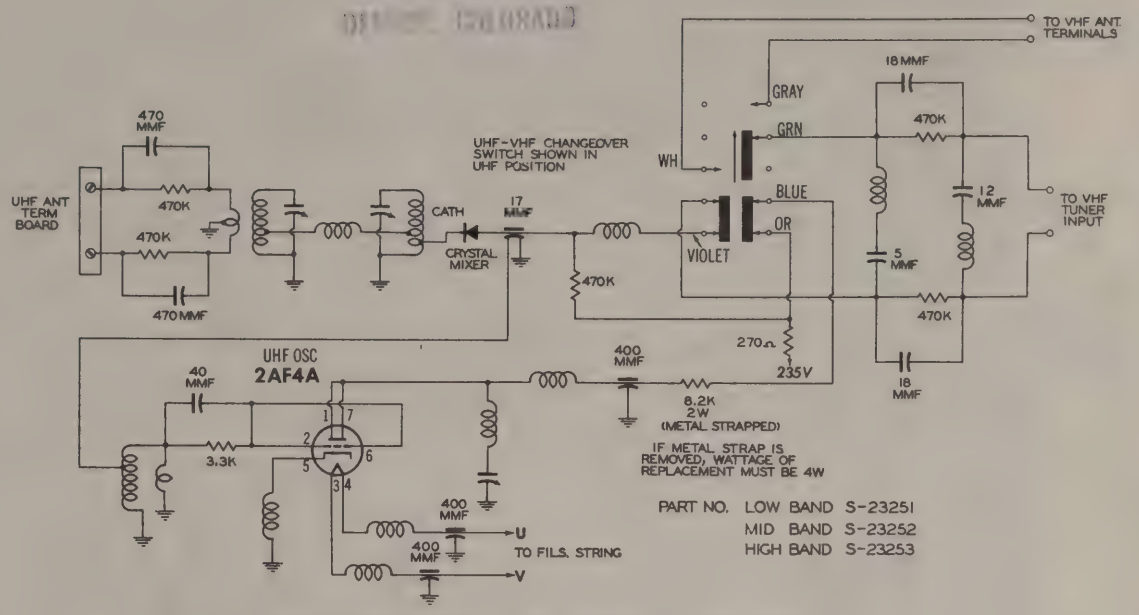
L. F. BLANKENSHIP
OF COLORADO



UHF CHANNEL ADAPTOR USED WITH SOME VERSION OF CHASSIS 16X20

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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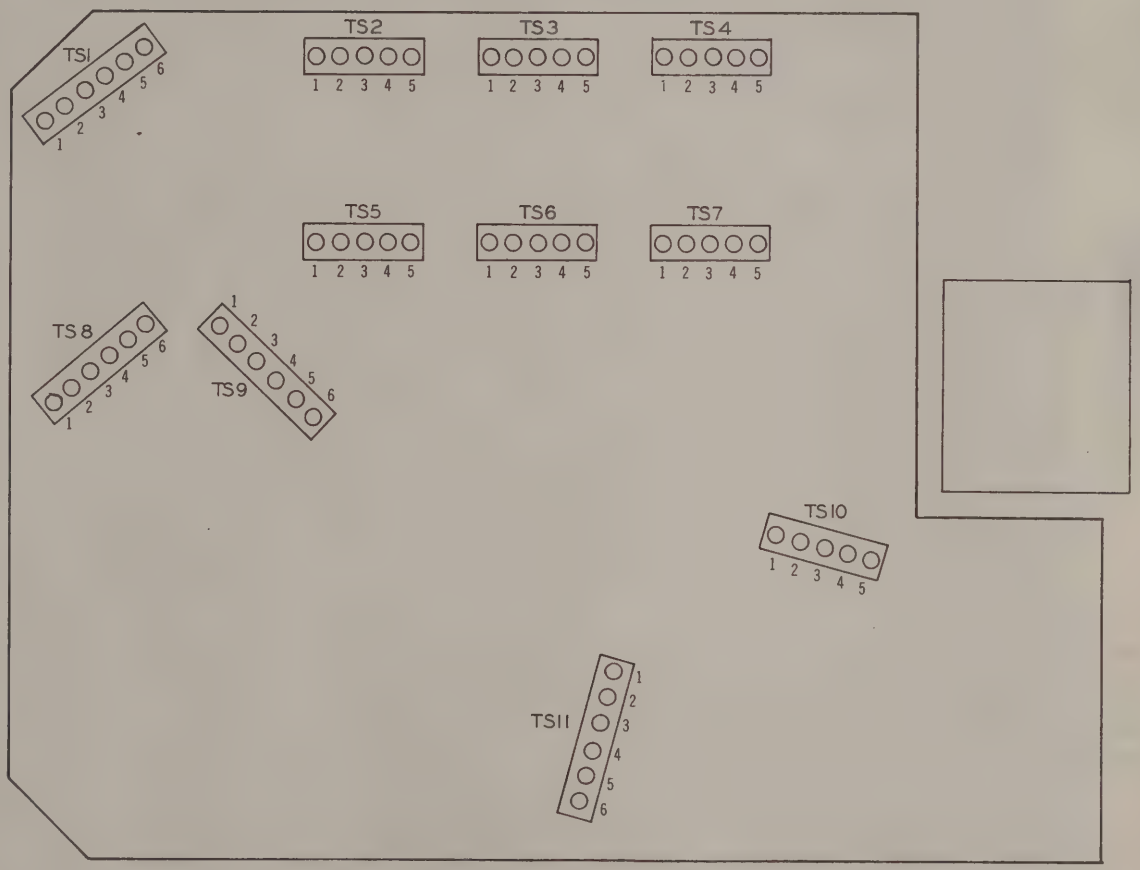
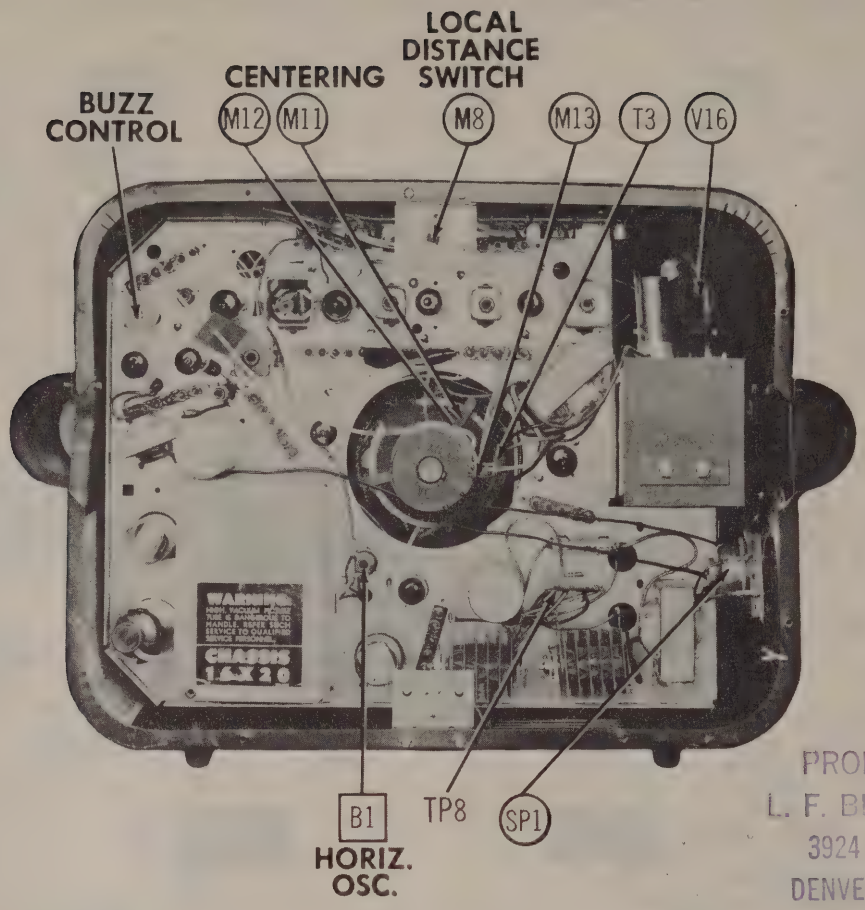
UHF TUNER SCHEMATIC



TERMINAL LOCATION CHART

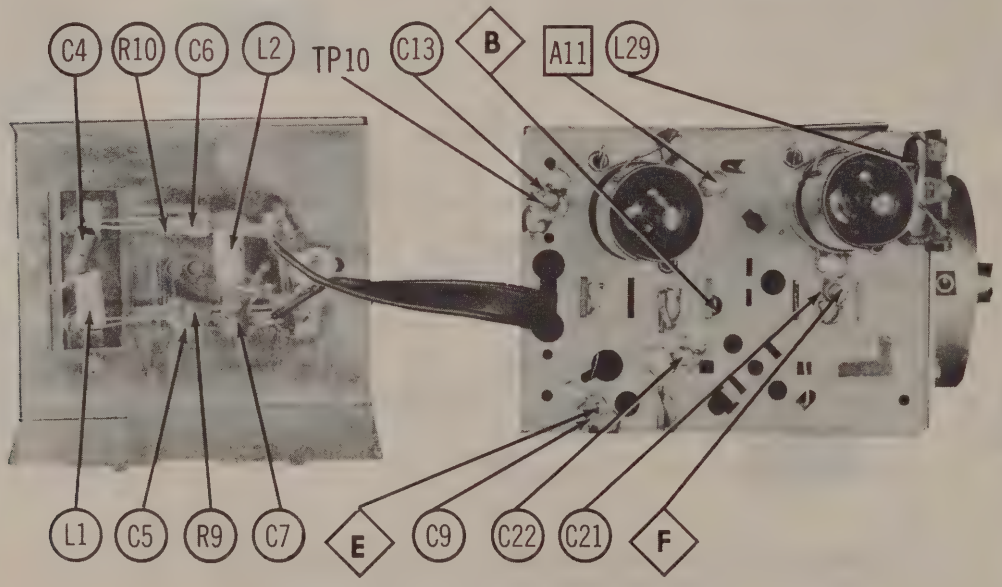


PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

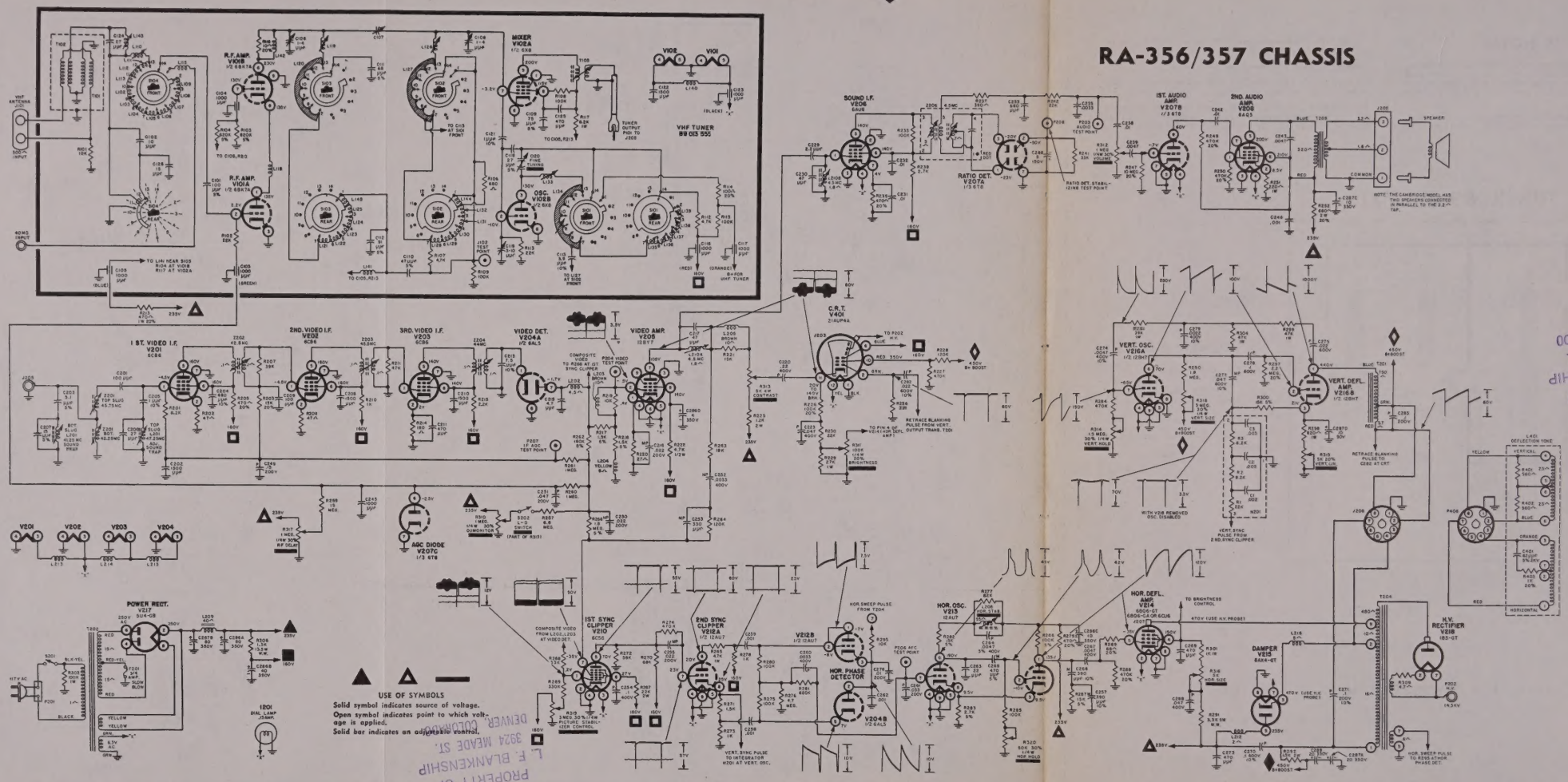
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably a test pattern.
2. Connect a .5MFD capacitor from point Ⓖ to chassis.
3. Set the horizontal hold control until the picture synchronizes horizontally (picture may not hold steady.).
4. Remove the .5MFD capacitor from point Ⓖ and chassis.
5. Adjust the horizontal stabilizer slug (B1) until picture again locks into horizontal sync without readjusting the horizontal hold control.



RF TUNER TOP VIEW

RA-356/357 CHASSIS


USE OF SYMBOLS
Solid symbol indicates source of voltage.
Open symbol indicates point to which voltage is applied.
Solid bar indicates an adjustable control.
PROPERTY OF L. F. BLANKENSHIP 3924 MEADE ST. DENVER, COLORADO

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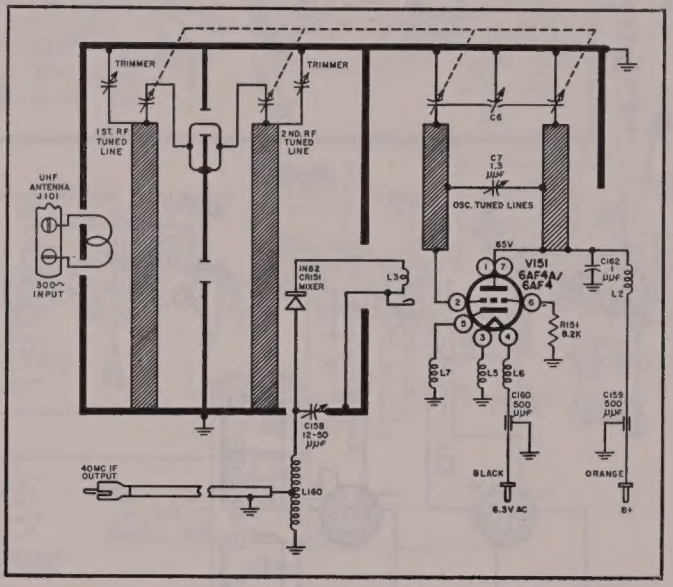
CHASSIS NOTES

1. All waveforms and voltages were taken under operating conditions. The receiver was tuned to an average strength TV signal, the Contrast control rotated fully clockwise and the Picture Stabilizer control was rotated fully counter-clockwise.
2. The Picture Stabilizer control and switch consists of a potentiometer, R319, and a snap switch, S202. When R319 is rotated fully counter-clockwise S202 opens (Local position as shown in the schematic).
3. Voltages ± 20% of those shown are normal.
4. All resistors are 10%, one-half watt, unless otherwise indicated. W. W. indicates wire wound resistor.
5. All capacitors are 20%, 500V, unless otherwise indicated. All capacitors are ceramic, unless indicated as follows: M-Mica, P-Paper, ± -Electrolytic, MP-Molded Paper

UHF TUNER 89 013 771



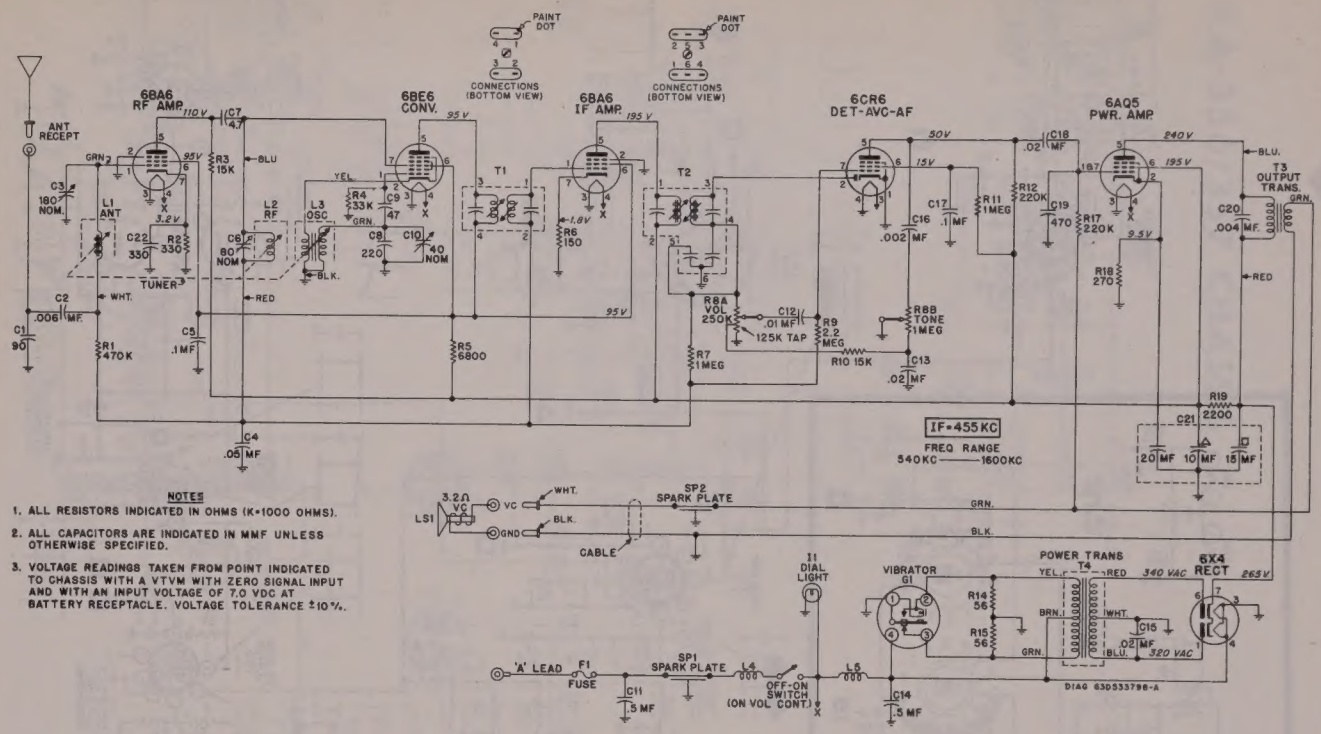
TUNER NOTES

1. Tuner 89 013 555 is used in RA-356 Chassis.
2. A UHF/VHF tuner combination consisting of VHF tuner 89 013 555 and UHF tuner 89 013 771 is used in RA-357 Chassis.
3. RA-357 Chassis are equipped with an antenna crossover network, part number 88 001 021.

DUMONT

Chassis RA-356, RA-357

SCHEMATIC COURTESY DUMONT LABORATORIES

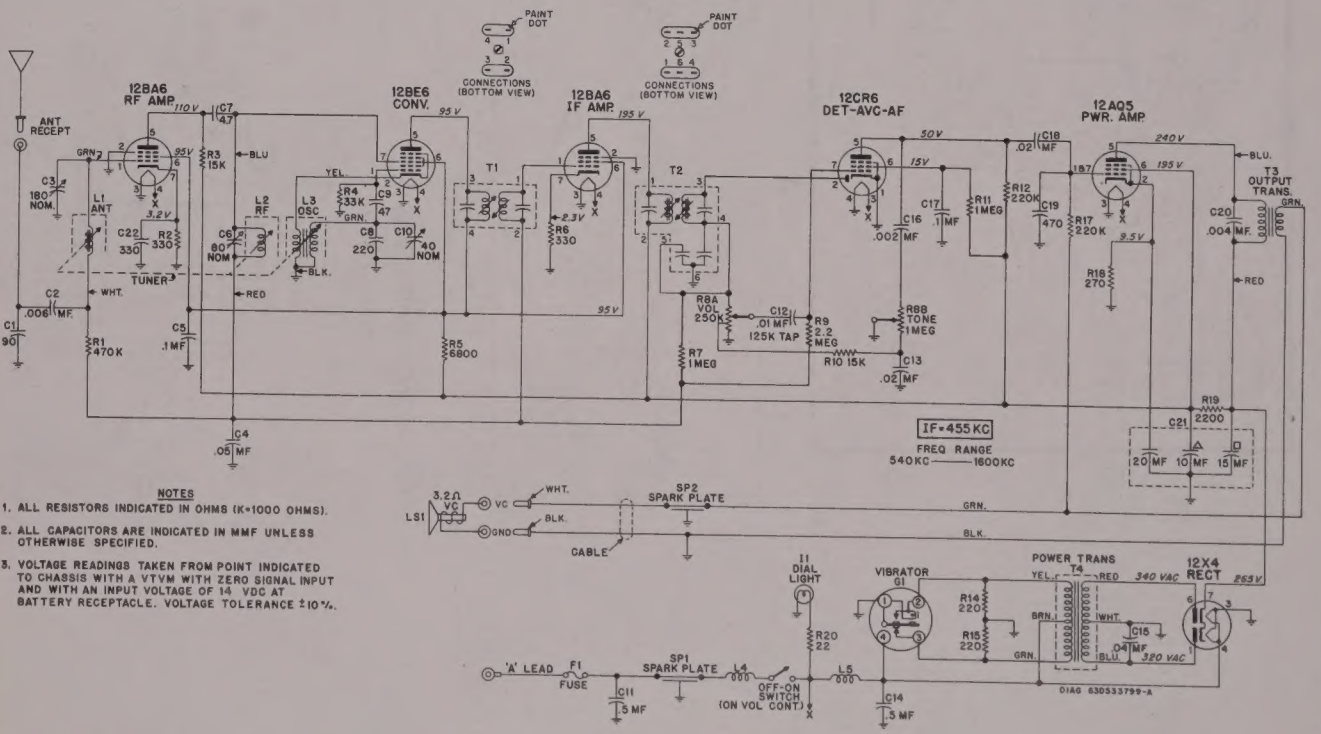


NOTES

1. ALL RESISTORS INDICATED IN OHMS (K=1000 OHMS).
2. ALL CAPACITORS ARE INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.
3. VOLTAGE READINGS TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM WITH ZERO SIGNAL INPUT AND WITH AN INPUT VOLTAGE OF 7.0 VDC AT BATTERY RECEPTACLE. VOLTAGE TOLERANCE ±10%.

SCHEMATIC COURTESY
MOTOROLA, INC.

MOTOROLA MODEL
1L5TCA, 1L5TCA-12



NOTES

1. ALL RESISTORS INDICATED IN OHMS (K=1000 OHMS).
2. ALL CAPACITORS ARE INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.
3. VOLTAGE READINGS TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM WITH ZERO SIGNAL INPUT AND WITH AN INPUT VOLTAGE OF 14 VDC AT BATTERY RECEPTACLE. VOLTAGE TOLERANCE ±10%.